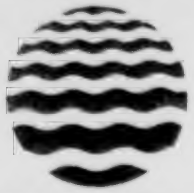
STOPPING WATER POLLUTION AT ITS SOURCE



MISA

Municipal/Industrial Strategy for Abatement

THE DEVELOPMENT DOCUMENT FOR THE DRAFT EFFLUENT MONITORING REGULATION FOR THE IRON AND STEEL SECTOR

Environment Ontario

Jim Bradley
Minister

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MUNICIPAL-INDUSTRIAL STRATEGY FOR ABATEMENT (MISA)

THE DEVELOPMENT DOCUMENT FOR THE DRAFT EFFLUENT MONITORING REGULATION FOR THE IRON AND STEEL SECTOR

February 1989

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USE OF THE MISA SECTOR SPECIFIC REGULATIONS WITH THE GENERAL REGULATION

Under the MISA program, the monitoring requirements for each sector are specified in two regulations - The General Effluent Monitoring Regulation (Ontario Regulation 695/88) and the relevant sector-specific regulation.

The General Effluent Monitoring Regulation provides the technical principles which are common to all sectors. It covers the "how to" items such as sampling, chemical analysis, toxicity testing, flow measurement and reporting.

The sector-specific regulation specifies the monitoring requirements of each direct discharger, such as the actual parameters to be monitored, the frequency of monitoring and the regulation in-force dates.

The General Effluent Monitoring Regulation, which must be used in conjunction with the sector specific regulation, is published under separate cover. The same document also includes a discussion of the MISA approach to effluent monitoring.

FOREWORD

The Municipal/Industrial Strategy for Abatement (MISA) program is aimed at reducing discharges of toxic contaminants to Ontario's waterways. The ultimate goal of the MISA program is the virtual elimination of persistent toxic contaminants from all discharges to Ontario's receiving waters.

This document contains:

1. An overview of the iron and steel sector which includes descriptions of the Ontario Iron and Steel Sector plants.

2. The Technical Rationale document for the Iron and Steel Sector which describes the derivation of the monitoring parameters and the monitoring frequencies specified in the Effluent Monitoring Regulation.

3. The draft Effluent Monitoring Regulation for the Iron and Steel Sector.

4. Explanatory Notes which explain the legal terms used in the Regulation.

5. The Misa Advisory Committee's (MAC) report to the Minister of the Environment on the Draft Effluent Monitoring Regulation for the Iron and Steel Sector.

6. The Ministry of the Environment's response to the Misa Advisory Committee report.

EXECUTIVE SUMMARY

The Iron and Steel Sector in Ontario consists of seven plants, four of which are integrated iron and steel mills where cokemaking, ironmaking, steelmaking and various finishing operations are carried out. Two plants produce carbon steel and one plant produces specialty steel using electric arc furnaces .

The Technical Rationale document provides the basis for monitoring process subcategory streams upstream of final treatment. Each plant will monitor several specific process subcategories so that on an industry wide basis all the process subcategories will be monitored. The Technical Rationale also provides the basis for the selection of parameters and the monitoring frequencies associated with each process subcategory stream and final effluent stream.

The Iron and Steel Sector Effluent Monitoring Regulation states the monitoring, toxicity testing, flow measurement and reporting requirements that each iron and steel plant must meet.

There are fifty-two sampling points identified in the Regulation. Depending upon the stream classification daily, thrice weekly, weekly, monthly, twice per year or event orientated monitoring may be required for up to 149 conventional pollutants, metals and organic contaminants at each sampling point.

There is also provision made for additional weekly sampling to be carried out for a period of up to six months following the completion of the initial one year regulatory monitoring period.

Explanatory Notes explain the legal text of the Effluent Monitoring Regulation in a simplified format which is similar to the format of the Effluent Monitoring Regulation.

PART I
OVERVIEW OF THE IRON AND STEEL SECTOR

PART I - OVERVIEW OF THE IRON AND STEEL SECTOR

I INTRODUCTION

The first part of this section serves as an introduction to the Iron and Steel Sector. It defines iron and steelmaking, provides a historical overview of the industry and describes general iron and steelmaking processes including wastewater generation and treatment.

The section concludes with specific information on each of the plants comprising the MISA Iron and Steel Sector. Emphasis is placed on the unique features of each site and the potential impact of operations on the environment.

II DEFINITION OF IRON AND STEELMAKING

In the basic iron and steelmaking process, coal is converted to coke which is then combined with iron ore and limestone in blast furnaces to produce iron. The iron is then converted into steel in either basic oxygen or electric arc furnaces. Following these steelmaking operations, the steel is subjected to a variety of hot and cold forming and finishing operations. These operations produce products of various shapes and sizes, and impart desired mechanical and surface characteristics.

III HISTORICAL OVERVIEW OF IRON AND STEELMAKING

The time when man first began to make ferrous metals by the reduction of iron ore is not known with certainty. However, it is believed that as early as 1350 BC to 1100 BC the ancient civilizations of Rome, Greece, Egypt and China were using ferrous metal products (1).

The following chronology highlights some of the important milestones in iron and steelmaking:

* About 1500 AD blast furnaces were used in England.

* In 1619, coke was used as a blast furnace fuel, however, its widespread use was not adopted until about 1730.

* In the early 1800's, the principle of heating air before it was blown into the blast furnace was introduced.

* In 1859, attempts were made to collect blast furnace gases before they flared and use them as fuel by leading them through suitable piping to ground level where they could be burned in special structures called stoves.

* By 1868 the use of open-hearth furnaces had become widespread in North America. These furnaces had acid resistent linings and sand bottoms for the hearths.

* In 1847, Henry Bessemer developed the principles of steelmaking where the oxidation of the major impurities occurred before the major oxidation of iron.

* In 1800, Sir Humphery Davy discovered the carbon arc which was the beginning of the arc-type furnace.

* The practical application of arc-type furnaces began with the work of Sir William Sienments who in 1878 constructed and operated both direct-arc and indirect-arc furnaces.

* Basic oxygen furnace steelmaking where oxygen is injected into the furnace vessel during the steelmaking process in order to speed up the rate of reaction started in 1955 and has since become the leading steelmaking process.

IV PRINCIPAL RAW MATERIALS

The principal raw materials used in the production of iron and steel are coal, limestone and dolomite and iron bearing materials (iron ore and pellets). Coal is used to produce coke and limestone and dolomite are used as fluxes to make furnace slags more fusible and to combine with unwanted impurities. Iron bearing materials are used to produce molten pig iron which is used in the steelmaking process.

V IRON AND STEELMAKING PROCESSES

Iron and steelmaking involves the conversion of coal to coke which is combined with iron ore and limestone in blast furnaces to produce iron. The iron is then converted into steel in either basic oxygen furnaces or electric arc furnaces. Following these steelmaking operations the steel is subjected to a variety of hot forming, cold forming and finishing operations. These operations produce products of various shapes and sizes and impart desired mechanical and surface characteristics.

Iron and steelmaking can be divided into the following process subcategories: Cokemaking, Sintering, Ironmaking, Steelmaking, Continuous Casting, Cold Forming, Hot Forming, Salt Bath Descaling and Acid Pickling.

SUBCATEGORY A: COKEMAKING

Cokemaking operations involve the production of coke in by-product coking ovens. The production of metallurgical coke is an essential part of the integrated steel industry since coke is one of the basic raw materials necessary for the operation of ironmaking blast furnaces.

Metallurgical coke is the residue from the destructive distillation of bituminous coal in the absence of air. Its main purpose is to supply a suitable fuel for use in an iron making blast furnace. As a result of the coking operation, there are three main by-products: coke oven gas, coal chemicals and coke breeze.

The 'fines' or coke breeze which remain after crushing and screening are recycled or reused as low-grade fuel. For every tonne of coke that is produced there are approximately 50 kg of coke breeze generated. A typical by-product coking operation is illustrated in Figure 1.

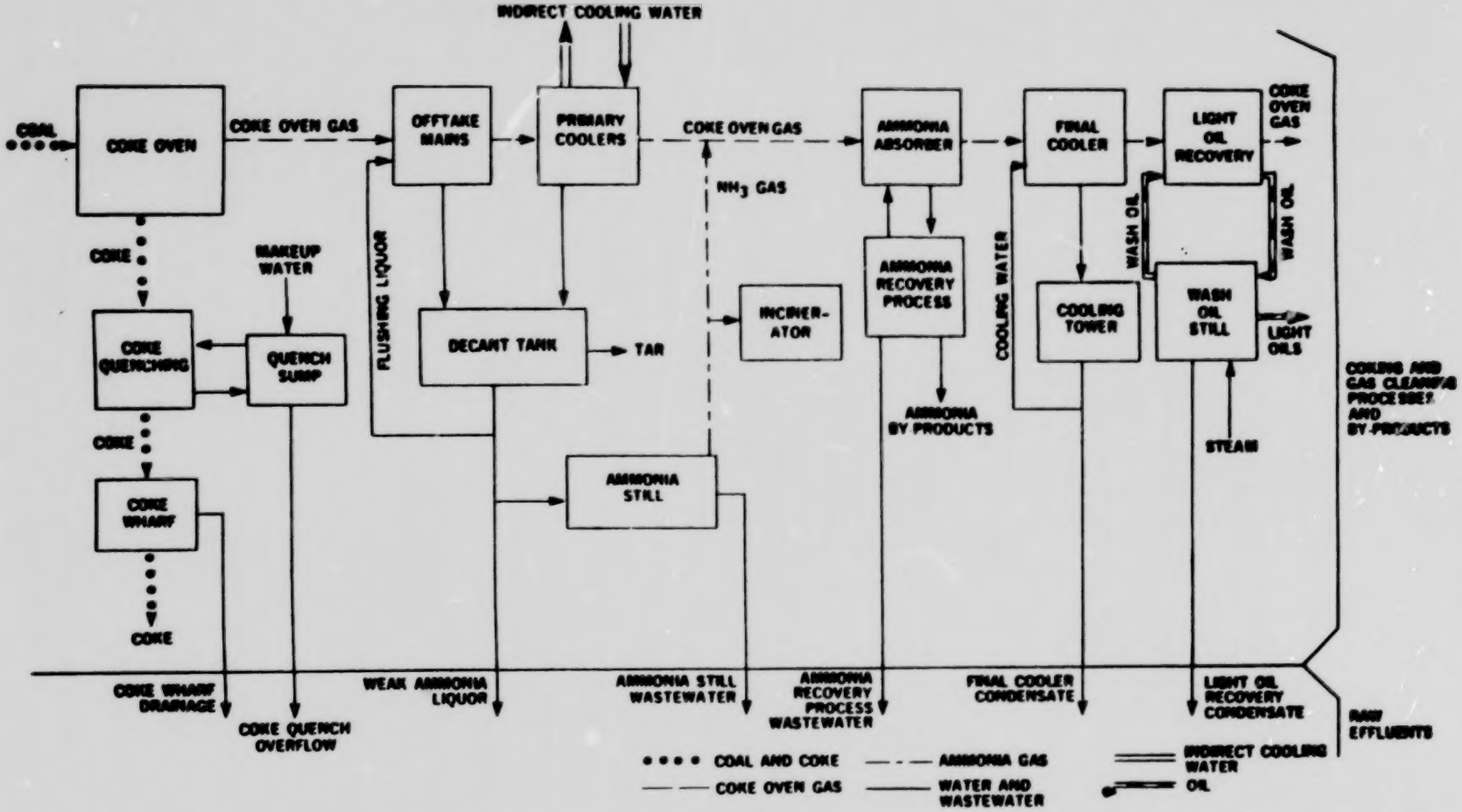

FIGURE 1 PROCESS FLOW DIAGRAM OF BY-PRODUCT COKE MANUFACTURE

In by-product coke ovens, the coke oven gas is collected, cleaned and reused as a fuel. Tar, light oil, ammonia and sulphur are recovered as by-products. Wastewaters may result from coke quenching and gas scrubbing operations.

SUBCATEGORY B: SINTERING

Sintering operations involve the production of an agglomerate which is used as one of the feed materials in the iron and steel making process. This agglomerate or "sinter" may be produced from ore fines and recycled materials such as mill scale and flue dust which have been generated by blast furnace and basic oxygen furnace operations and scale which has been recovered from hot forming operations.

Wastewaters are generated in sintering operations as a result of the scrubbing of dust and gases produced in the sintering process. Quenching and cooling of the sinter may generate additional wastewater.

SUBCATEGORY C: IRONMAKING

Ironmaking operations involve the reduction of iron bearing materials in the presence of limestone and coke in large cylindrical blast furnaces. The gases produced as a result of the ironmaking process are a valuable fuel. These gases are heavily laden with dust and require scrubbing prior to reuse. Blast furnace wastewaters are generated as a result of these cleaning operations.

Blast furnace wastewaters may be generated from air cleaning systems in stockhouses and dekishing stations. Stockhouses are where raw materials are mixed. Wet scrubbing systems or baghouses are used to remove particulate matter. Dekishing stations are where slag and residual iron are removed from hot metal cars. Slag can be cooled in a slag pit which is essentially a wet operation where any wastewater overflow has the potential to enter the waste stream. A slag pelletizing machine can also be used which requires controlled amounts of water. A typical blast furnace process flow is shown in Figure 2.

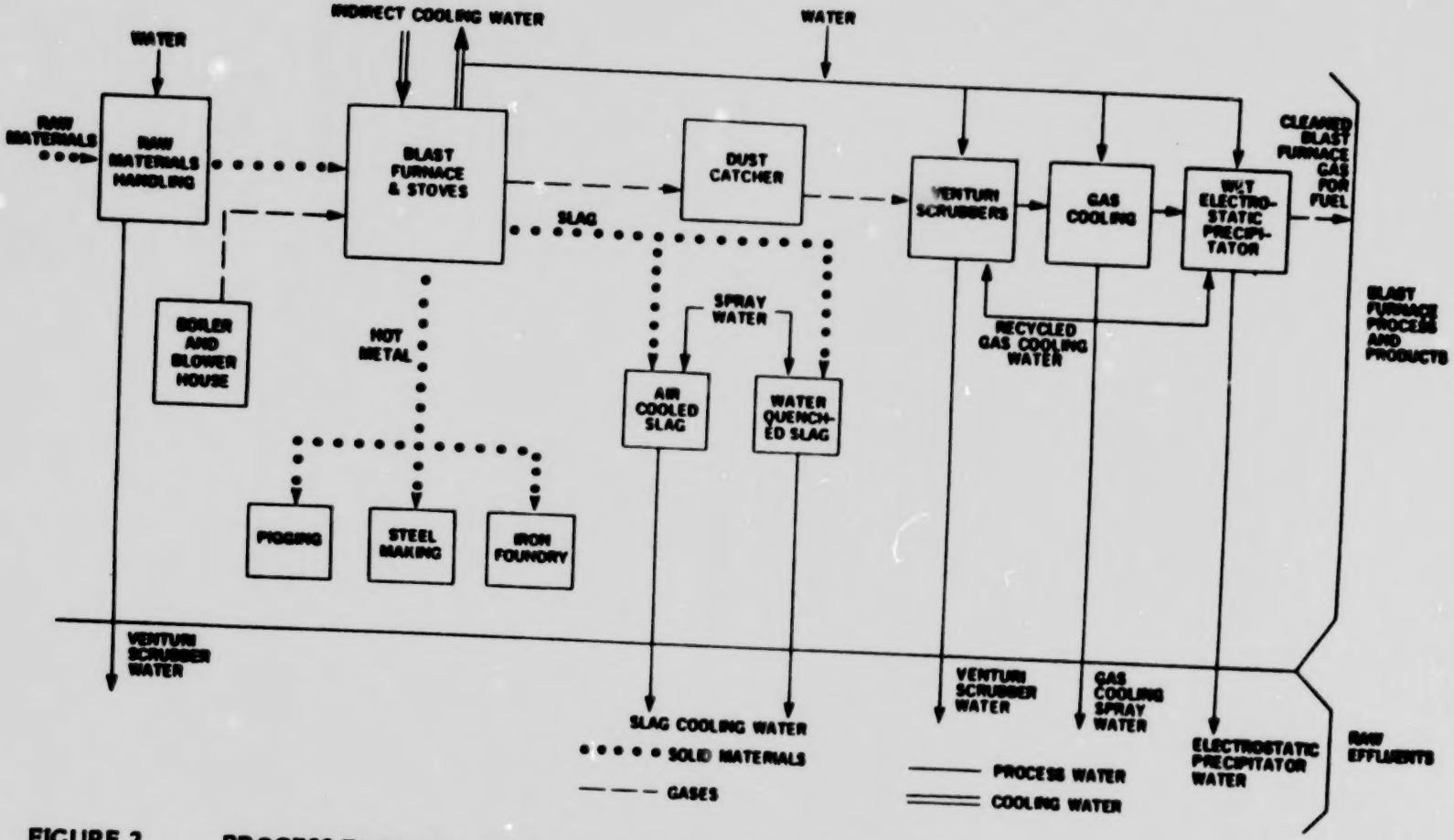

FIGURE 2 PROCESS FLOW DIAGRAM OF BLAST FURNACE OPERATIONS

SUBCATEGORY D: STEELMAKING

Steelmaking operations involve the production of steel in basic oxygen and electric arc furnaces. These furnaces generally receive iron produced in blast furnaces along with scrap metal and fluxing materials. Some electric arc furnaces use scrap only.

The fume, smoke and waste gases generated during steelmaking require cleaning prior to emission to the atmosphere. There are two types of gas cleaning operations: wet and dry. Steelmaking wastewaters are generated as a result of wet gas cleaning operations.

SUBCATEGORY E: CONTINUOUS CASTING

An additional process which is considered to be part of the 'steelmaking ' area is continuous casting. The continuous casting process is used to produce semi-finished steel directly from molten steel. The molten steel from the steelmaking operation is continuously cast into blooms, billets or slabs and may eliminate mould preparations, ingots and stripping operations. The semi-solidified steel is then sprayed with water. The water further cools the steel and removes scale from the steel surface.

SUBCATEGORY F: COLD FORMING

The cold forming process can be divided into two individual operations: cold rolling and cold tube forming.

Cold rolling is used to reduce the thickness of steel products. It produces a smooth dense surface and develops controlled mechanical properties in steel. Emulsified oils are used as metal working lubricants and are sprayed onto the steel materials as they enter the work rolls of the cold rolling mill. The steel materials may also be coated with oil prior to recoiling after they have passed through the mill. The oil prevents rust while the materials are in transit or in storage. Emulsified oils are the major pollutants in wastewaters resulting from this operation.

In the cold tube process, cold flat steel strips are formed into hollow cylindrical products. Wastewaters are generated as a result of continuous flushing with water or emulsified oil lubricants.

SUBCATEGORY G: HOT FORMING

Hot forming is the steel forming process in which hot steel is transformed in size and shape through a series of forming steps to produce semi-finished and finished steel products. Feed materials may be ingots, continuous caster billets or blooms and slabs from primary hot forming mills.

The hot forming mill is comprised of a group of rolling mills which have similar basic wastewater characteristics. These mills include:

Bloom Mill	Hot Strip Mill
Billet Mill	Rod and Bar Mill
Plate Mill	Structural Mill
Slabbing Mill	Rail Mill

In the hot forming process, the hot metal continuously oxidizes and forms scale which must be removed. High pressure water is used to clean the surface of the steel and as a result, wastewaters contain large quantities of scale. Wastewaters are also generated by continuously spraying contact cooling water over the steel rolls in order to keep them cool. Scarfing may be used to remove imperfections in order to improve the quality of steel surfaces. Scarfing generates fumes, smoke and waste gases which require scrubbing. Scrubbing of these fumes generates wastewater.

SUBCATEGORY H: SALT BATH DESCALING

Salt bath descaling is the operation in which specialty steel products are processed in molten salt solutions in order to remove scale. There are two types of scale removal processes (ie. oxidation and reduction operations). The oxidizing process uses highly oxidizing salt baths which react far more aggressively with the scale than with the base metal. This chemical action causes surface scale to crack so that subsequent pickling operations are more effective in scale removal. Reducing baths depend upon the strong reducing properties of sodium hydroxide. Oxides are reduced to base metal.

SUBCATEGORY I: ACID PICKLING

Acid pickling is the process of chemically removing oxides and scale from the surface of the steel by the action of water solutions and inorganic acids. The three major wastewater sources associated with acid pickling operations are spent pickle liquor, rinsewaters and the water used to scrub acid vapours.

Most carbon steels are pickled in either sulfuric or hydrochloric acids or mixtures of the two. Most stainless steels and alloy steels are pickled in mixtures of nitric, hydrochloric acids and hydrofluoric acids.

VI WASTEWATER

A wide variety and concentration of pollutants may be found in iron and steelmaking wastewaters including both conventional and persistent toxic contaminants.

Characteristics of untreated process wastewaters generated by the same process subcategories are similar among different plants of the iron and steel industry.

The production of coke from coal, molten iron from iron ore, steel from molten iron and finished products from molten steel is generally based on processes common to and typical of the iron and steel industry.

Differences in the characteristics of the treated effluents are anticipated depending upon the type of treatment that is used (ie physical/chemical or biological treatment or a combination thereof) (2).

The discharge of conventional and toxic pollutants can be controlled through a combination of in-plant controls and wastewater treatment.

VII IN-PLANT CONTROLS

In-plant controls are very cost effective methods of limiting the discharge of pollutants through process modifications, water reduction and recycling.

Process modifications include measures to improve the efficiency of unit operations thereby reducing the amount of pollutants discharged in the wastewaters.

Recovery of by-products through physical treatment processes or recycling or through the control of spills from process or storage areas will also reduce losses. Additionally, changes to process equipment will further reduce the discharge of contaminants to the environment.

Recycling cooling water and reducing water usage will also reduce contaminant losses.

VIII WASTEWATER TREATMENT

Both biological and physical-chemical treatment processes may be used to control the pollutants discharged in iron and steel wastewaters (1).

Biological treatment involves contacting the wastewater with microorganisms which metabolize the wastes for energy and synthesis of new cells. Metals and some hydrocarbons are removed in biological processes by adsorption onto the biological flocs which in turn are removed from effluents by clarification or filtration. Biological treatment technologies include extended aeration coupled with activated sludge systems and lagoons (2).

Physical-chemical treatment technologies utilized by the iron and steel industry include flow equalization, neutralization, oily water separation, sedimentation/clarification, filtration, coagulation, flocculation and steam stripping. Generally, these technologies are applied to recover products or by-products, to reduce loadings to a biological treatment plant or to remove pollutants for which biological treatment may be ineffective.

Cokemaking wastewaters include the following:

1. Coke quenching effluent
2. Excess weak ammonia liquor
3. Blowdown from gas recovery and collection
4. Overflow from the final coolers

Coke quenching effluent discharges have been eliminated from most iron and steel mills.

Excess weak ammonia liquor is treated by distillation using ammonia stills to recover ammonia (see Figure 1). In some mills, the still effluent and condensates from the light oil and final coolers are treated using biological treatment. Water from the final coolers is sometimes recycled as a means of minimizing discharge.

Ironmaking wastewaters which originate from the blast furnace area are commonly treated by clarification and/or recycled. In addition, some mills treat the blowdown from the clarifier overflow by using subsequent clarification or filtration to remove metals and suspended solids. The clarifier underflow is usually dewatered by using a rotary vacuum filter. The dewatered material is then recycled to the sinter plant, stockpiled or disposed.

Steelmaking wastewaters, which are generated as a result of using wet gas cleaning methods, are treated using clarification in order to remove suspended solids. These wastewaters are recycled at some of the iron and steel mills.

Hot forming wastewaters include direct roll cooling water, runoff table sprays and flume flushing water. As these wastewaters contain large amounts of scale, scale pits are generally used as a treatment step in the removal of the heavy scale particles and floating oils. Scale pit effluents are diverted to lagoons or filtration units and are recycled at some of the iron and steel mills.

Cold forming wastewaters include the following:

1. Pickle line fume scrubber wastewater
2. Waste pickle liquor or the blowdown from the regeneration process
3. Rinsewater from the pickling lines
4. Concentrated bath solutions
5. Blowdown from the waste rolling oil recovery systems

Pickle line fume scrubber wastewaters are usually treated by neutralization with lime and clarification. Generally, pickle line rinsewaters are recycled or treated and if waste pickle liquor regeneration is practiced the rinsewaters can be used as absorber feed in the regeneration plant.

Cold rolling solutions which contain waste oil are normally recycled with a blowdown. Waste oils from the mill are separated and removed from the blowdown in a treatment plant using a combination of pH adjustment, emulsion breaking and coagulation.

Final effluent wastewaters, which may be a combination of process subcategory effluents, cooling water effluents and stormwater effluents, are generally treated at centrally located facilities where a combination of physical/chemical and biological wastewater treatment methods may be used.

IX THE IRON AND STEEL SECTOR IN ONTARIO

The iron and steel industry in Canada consists of twenty one plants. The industry comprises five integrated mills, 15 mini-mills and one specialty steel producer.

Integrated mills consists of cokemaking, ironmaking, steelmaking, cold forming, hot forming and finishing operations. Mini-mills and specialty steel mills consist of steelmaking, hot forming and finishing operations

Eight of Canada's iron and steel plants are located in Ontario with seven of them classified as direct dischargers and included in the Iron and Steel Sector for regulation under the MISA program.

X SECTOR OVERVIEW

An overview of each of the Iron and Steel Sector companies is provided in this section. Information such as the location of the plant site(s), number of employees, products and raw materials, processes and effluent treatment is provided.

THE ALGOMA STEEL CORPORATION LIMITED

Algoma Steel is located in Sault Ste. Marie, Ontario, adjacent to the St. Marys River. The plant employs 8300 people and produces heavy structural and seamless tubular steel products and steel rails. In 1987, Algoma produced three million tonnes of steel.

Coal from four mining locations in West Virginia is converted into metallurgical coke in Algoma's six coke oven batteries. The coke is then combined with limestone, pelletized iron ore (from Wawa, Ontario and Ishpeming, Michigan) and sinter in four blast furnaces. Pig iron from the blast furnaces is converted into various grades of steel in Algoma's two basic oxygen furnaces. The steel is then formed into ingots or continuously cast for further processing at five hot rolling mills and four cold rolling mills.

Wastewaters from cokemaking processes are treated using ammonia recovery stills and settling basins. Wastewaters from ironmaking and steelmaking operations are treated using clarifiers. Wastewaters from Algoma's hot and cold rolling mills are treated using settling basins.

Wastewaters are discharged from the site through six outfalls to the St. Marys River at a rate of 500×10^3 cubic metres per day.

ATLAS SPECIALTY STEELS

Atlas Specialty Steels is located in Welland, Ontario, adjacent to the Welland River. The plant employs 1200 people and produces specialty steel products. These products include stainless, carbon, low and high alloy, tool, machinery and mining steels in billet and ingot form. In 1987, Atlas Specialty Steels produced 200,000 tonnes of steel.

Electric arc furnaces are used to melt scrap metal . Argon ladle refining, vacuum oxygen decarburizing and vacuum arc degassing are used to refine the steel melt. The steel is then continuously cast or subject to top pour ingot teeming or bottom pour ingot teeming. Surface imperfections are removed from billets and ingots in conditioning operations prior to further processing.

The steel undergoes either forging or hot rolling. Hot rolling consists of primary rolling to produce blooms, billets and large bars and secondary rolling to produce specialty steel shapes. Following the forging and hot rolling processes, the steel may undergo heat treating, machining or cold finishing.

Waste effluent is treated by two wastewater filtration/reclamation plants and a waste acid treatment/solidification plant. The two wastewater filtration/reclamation facilities are credited with reducing total plant water consumption by 27% through increased recirculation.

Wastewater is discharged from the site through one outfall to the Welland River at a rate of 35×10^3 cubic metres per day.

DOFASCO

Dofasco is located in the City of Hamilton, Ontario, adjacent to Hamilton Harbour. The plant employs 11,600 people and produces flat rolled, cold rolled, galvanized, galvalume, tinplate, and silicon electrical steel.

Production of steel ingots and castings have totalled more than 4.5 million tonnes annually. Shipments of flat rolled product, semi-finished steel and steel castings amount to more than 3.4 million tonnes per year.

Coal is converted into metallurgical coke in Dofasco's six coke oven batteries. The coke is then combined with limestone, iron ore in four blast furnaces. Pig iron from the blast furnaces is converted into steel in Dofasco's four basic oxygen furnaces. The steel is then continuously cast for further processing at two hot strip mills and five cold rolling mills.

Dofasco has four temper mills, four pickle lines, four galvanizing/galvalume lines, two electrolytic tinning lines and two silicon electrical steel lines to further condition the steel.

Coke production wastewater is treated using ammonia recovery stills and a biological treatment plant.

Wastewaters from ironmaking and steelmaking processes are treated by clarification. Hot strip mill wastewaters and wastewaters from the continuous casting mill are treated by two filtration plants which work on the principle of deep bed filtration and water recycle.

Wastewaters from the cold rolling mills, temper mills, pickle lines, galvanizing lines, electrolytic lines and silicon electrical steel lines are treated by neutralization, clarification and oil removal operations prior to being discharged for further treatment at the Regional Sewage Treatment Plant.

Dofasco has installed two acid regeneration plants and an ion exchange system to treat waste solutions of hydrochloric acid from the pickle lines and chromic acid solutions from the electrolytic tinning lines respectively.

Wastewaters are discharged through five outfalls to Hamilton Harbour at a rate of 861 x 10^3 cubic metres per day, seventy percent of which is non-contact cooling water.

IVACO ROLLING MILLS

Ivaco Rolling Mills is situated in L'Orignal, Ontario, adjacent to the Ottawa River. The plant employs 600 people and produces billets in a comprehensive range of high and low carbon steel grades. In 1987, Ivaco Rolling Mills produced 500,000 tonnes of steel products.

Two electric arc furnaces are used to melt steel scrap which is then continuously cast into steel billets. The billets are hot rolled into wire rods and are sent to markets all over North America.

Wastewater is treated using scale pits, filters and oil skimming systems. There is no discharge of process wastewaters since they are recycled. Non-contact cooling waters and storm waters are discharged from the site through one outfall to Mill Creek which empties into the Ottawa River.

LAKE ONTARIO STEEL COMPANY LIMITED (LASCO)

LASCO is located in Whitby, Ontario adjacent to Lake Ontario. The plant employs 1100 people and produces low carbon steel grade products. In 1987, LASCO produced 660,000 tonnes of steel products.

LASCO uses electric arc furnaces to melt scrap steel. The molten steel is cast into billets and is then hot rolled into final products.

LASCO uses water in both cooling water systems and process water systems. Cooling water systems recirculate water to electric arc furnaces, caster molds, reheat furnaces and furnace equipment. These systems are closed ones where cooling waters do not come into contact with production materials.

Process water systems supply casting sprays, direct evaporative spray chambers, mill and bar cooling operations, old caster cooling equipment, and descalers.

Wastewaters are treated using scale pits, filters and oil skimming systems and are discharged to Lake Ontario at a rate of 25×10^{3} cubic metres per day.

STELCO STEEL - HILTON WORKS

Stelco Steel's Hilton Works is located in Hamilton, Ontario, adjacent to Hamilton Harbour. The plant produces plate flat rolled, cold rolled, galvanized, tin plate and bar products and shaped steel. In 1987, Stelco Inc. produced about 5 million tonnes of steel products. Stelco Inc. employs 10,580 people in the Hilton works and Lake Erie works

Coal is converted into metallurgical coke in Stelco's five coke oven batteries. The coke is then combined with limestone, iron ore and sinter in three blast furnaces. Iron from the blast furnaces is converted into various grades of steel in three basic oxygen furnaces. The steel is then formed into ingots or continuously cast by two continuous casters for further processing at the hot rolling mills.

The primary hot rolling mills consist of slabbing mills and bloom and billet mills. The secondary hot rolling mills consist of bar mills, strip mills and rod and plate mills.

There are also strip finishing and strip cleaning operations, cold rolling mills and temper mills, annealing processes, sheet coating processes involving galvanizing, tin lines and finishing facilities.

Wastewater treatment has been achieved through sewer separation, water recycle, treatment for specific contaminants and combined final treatment including filtration.

Wastewaters from ironmaking processes are recycled with any blowdown and receive treatment at the East Side Final Treatment Plant. The East Side Final Treatment Plant consists of two sedimentation basins followed by filtration.

Wastewaters from primary mills and hot rolling mills are treated using scale pits and flow to the East Side Final Treatment Plant. Most of the cooling water from the hot rolling mills is cascaded and is used for scale flushing where it becomes a source of process water.

Emulsified oils from cold rolling operations and recovered oils from all other parts of the plant are processed in an oil/water separation plant. The separated water flows to the East Side Final Treatment Plant.

Spent acid from hydrochloric acid pickling lines is treated at a hydrochloric acid regeneration plant and is then reused. Rinse water from the tin lines is processed in an ion exchange plant to remove chrome and the water is recycled.

Wastewaters are discharged from the site though seven outfalls to Hamilton Harbour at a rate of 1.1×10^6 cubic metres per day.

STELCO STEEL - LAKE ERIE WORKS

Stelco Lake Erie Works is located in Nanticoke, Ontario, adjacent to Lake Erie. The plant produces both finished steel for customers and semi-finished steel for further processing at the Hilton Works plant of Stelco Steel.

Coal is converted into metallurgical coke in coke ovens. The coke is then combined with limestone and iron ore in blast furnaces. Iron from the blast furnaces is converted into various grades of steel in basic oxygen furnaces. The steel is then continuously cast for further processing at hot rolling mills.

The plant was designed to incorporate state of the art wastewater recycle and treatment concepts. There are separate sewers for sanitary, process, storm and cooling waters. Process water and clean non-contact cooling water are recycled. As a result water discharge is minimized.

A limited blowdown from recycled systems is required to discharge hardness received form the supply water. Blowdown receives secondary treatment in a blowdown treatment system which includes primary solids removal, flocculation, clarification and alkaline breakpoint chlorination. Polishing filtration is provided for all flow through the plant.

Tertiary wastewater treatment is achieved in a final terminal settling basin where up to 7 days hydraulic retention time is provided. This terminal basin also provides extended settling time for storm water during storm events.

There are gathering and holding facilities for drainage from raw material storage areas with provision for recycle as a dust suppressant on the storage piles. There are other holding basins throughout the plant to permit bypasses from individual recycle systems in a case of upset or spill conditions.

Treated wastewater from the blowdown treatment plant is discharged at a rate of 40,000 cubic metres per day to a stabilization pond and then to Lake Erie via Centre Creek.

PART II
TECHNICAL RATIONALE FOR THE MONITORING REQUIREMENTS

PART II- TECHNICAL RATIONALE FOR THE MONITORING REQUIREMENTS

I INTRODUCTION

The purpose of the technical rationale section is to explain the steps in the development of the Iron and Steel Sector Effluent Monitoring Regulation.

The section provides background information on the regulation process, the Iron and Steel Sector monitoring approach and the databases and criteria used for parameter and monitoring frequency selection.

II DEFINITION OF THE IRON AND STEEL SECTOR

The Iron and Steel Sector in Ontario comprises integrated, specialty steel and mini-mills involved in several or all of the production processes used in the manufacturing of iron and steel.

There are seven Iron and Steel Mills in Ontario. Four of these mills are integrated iron and steel works (ie. Algoma Steel, Stelco Hilton Works, Stelco Lake Erie Works and Dofasco) while the remaining three mills are specialty steel mills or mini-mills which use electric arc furnaces (ie. Lasco, Ivaco and Atlas Steel).

III THE NEED FOR REGULATION

Iron and steel industrial process effluents may contain ammonia, cyanide, phenolics (4AAP)s, suspended solids, oil and grease, PAH's, volatiles (mainly benzene) and heavy metals (ie. zinc, iron, lead, and chromium). With the large volumes of effluent that are generated during iron and steel making processes, the loadings of these contaminants to receiving watercourses can cause negative environmental impacts.

Currently, the Iron and Steel Sector plants monitor and report only certain standard parameters and conventional pollutants under the Ministry of the Environment's Industrial Monitoring Information System (IMIS).

The reportable data include effluent flow and may include pH, COD, ammonia, cyanide, total phosphorus, total suspended solids (TSS), total dissolved solids (TDS), volatile suspended solids (VSS), phenols, sulphides, oil and grease and selected metals.

Site specific monthly average IMIS data are published by the Ministry in its annual report entitled "Report on the Industrial Direct Dischargers in Ontario" (3). The IMIS data are reported to the Ministry on a voluntary basis.

There are currently no regulations for specific, toxic and persistent pollutants, generally termed "priority pollutants". In fact, there exists only a very limited data base on the concentrations and loadings of these priority pollutants being discharged into Ontario's waterways.

The MISA effluent monitoring regulation for the Iron and Steel sector will provide a comprehensive long term data base on the discharges of priority pollutants from the iron and steel sector plants.

This data base will be used in conjunction with other environmental studies and historical data to set effluent limits on the discharge of these pollutants to our waterways.

IV THE U.S. EPA EXPERIENCE

The United States Environmental Protection Agency (EPA) promulgated Effluent Limitations and Standards for the Iron and Steel Industry in the United States in 1986 (4).

The Agency studied the iron and steel industry to determine whether differences in raw materials, final products, manufacturing processes, equipment, age and size of plants, water usage, wastewater constituents, and other factors justified the development of separate effluent limitations and standards for different segments of the industry.

The Agency collected information concerning production processes, production capacity and rates, process water usage, wastewater generation rates, wastewater treatment and disposal methods, treatment costs, location, age of production and treatment facilities, as well as analytical information on influent and effluent quality from 391 steelmaking operations and 1,632 steel forming and finishing operations.

Detailed information was collected on long term effluent monitoring data and specific production operations from 50 basic steelmaking facilities and 128 forming and finishing facilities.

To determine the presence and level of conventional and priority pollutants in iron and steelmaking effluents, the Agency conducted effluent and flow measurement monitoring at representative iron and steel plants. The Agency conducted a two part sampling and analysis program at 31 basic steelmaking facilities and 83 forming and finishing facilities .

After an extensive review of the data that was obtained from these studies, the Agency adopted a scheme based on process subcategorization. Process-based subcategorization was warranted because:

- the data suggested that similar iron and steel process subcategories produce wastewaters with similar characteristics regardless of mill location;
- it accurately reflects production operations;
- the wastewaters of different processes contain different pollutants requiring treatment by different control systems;
- the process water usage and wastewater flows for the iron and steel sector vary significantly among different process subcategories thus affecting the type of treatment used;

Average wastewater concentrations and loadings for each conventional and priority pollutant were determined for each process subcategory. These concentrations and loadings were used to determine the United States EPA Effluent Limits for each process subcategory.

The United States Iron and Steel Effluent Regulation limits sixteen pollutants: nine priority pollutants and seven conventional pollutants. The data available to the Agency generally showed that the control of these pollutants would result in comparable control of toxic pollutants not specifically limited.

The Agency stated that by establishing specific limitations for indicator pollutants only, the high cost and delays of monitoring and analysis that would result from limitations for each pollutant would be significantly reduced.

The sixteen pollutants limited by the United States Iron and Steel Effluent Limits Regulation are:

Benzene	Naphthalene
Benzo(a)pyrene	Tetrachloroethylene
Chromium	Lead
Nickel	Zinc
Hexavalent Chromium	Cyanide
Phenolics (4AAP)	Ammonia
Oil and Grease	pH
Total Suspended Solids	Chlorine Residual

These pollutants were assigned to specific iron and steel sector process subcategories based upon the analytical data gathered by the Agency, the environmental impact of each pollutant, the ability of the compound to serve as an "indicator" for the presence of other pollutants and the treatability of each compound.

For example, ammonia, cyanide, phenolics (4AAP), benzene, naphthalene, and benzo(a)pyrene were assigned to cokemaking operations. The U.S. EPA set limits for each of these compounds and stated that these limits could be achieved at all cokemaking process subcategory operations.

V THE MINISTRY/IRON AND STEEL SECTOR DIALOGUE

The Ministry adopted an open consultative process both with industry and the public in developing the Iron and Steel Sector Effluent Monitoring Regulation. Public input was available in the Regulation formulating process through the MISA Advisory Committee (MAC). Members of the committee were appointed by the Minister on the basis of their knowledge, concern and expertise in matters dealing with the environment.

A Joint Technical Committee (JTC) consisting of Industry, Environment Canada and Ministry representatives served as the means for reaching consensus. A member of the MISA Advisory Committee also took part in the JTC discussions.

Agreement was reached with Industry on principles which were to serve as general guidelines for the monitoring regulation. A multi-discipline group of Ministry/Environment Canada/Industry experts developed the general rationale for the site-specific monitoring requirements. A joint Ministry/Industry Regulation Writing team then produced the Regulation text for review by the JTC.

On the basis of the rationale and the databases available to the Ministry, monitoring requirements were drawn up. The monitoring requirements were then reviewed for each plant site and were modified where required.

VI THE PROCESS SUBCATEGORY EFFLUENT MONITORING APPROACH

In limiting the discharges from iron and steelmaking industries in the United States, the U.S. EPA has imposed limits on effluents discharging from specific iron and steel process subcategories after a treatment. This approach effectively sets limits on process subcategory effluent streams prior to their dilution with cooling water.

The MISA pre-regulation monitoring program applied the approach taken by the U.S. EPA. Representative process subcategory effluent streams were monitored for a list of both conventional and priority pollutants. The effluent streams were monitored after a treatment but prior to final treatment. The results indicate that the approach taken was appropriate because of the nature of the processes and the resulting effluents from the iron and steel mills in Ontario.

Consistent with the U.S. EPA approach, the Ontario Iron and Steel Sector Effluent Monitoring Regulation requires the monitoring of effluents from specific process subcategories after treatment, prior to dilution with cooling water and prior to final treatment, if any. Monitoring of final effluent streams after final treatment, if any, is also required. The approach of monitoring process subcategory effluents prior to dilution is consistent with that applied to the other industrial sectors which will be regulated under the MISA program.

Each of the iron and steelmaking industries employs a different combination of process subcategories. Because of the consistent nature of the process subcategories, representative treated process subcategory effluent streams are required to be monitored. Some mills will, therefore, not have to monitor a process subcategory effluent stream if a representative one is to be monitored at another mill, provided that the method of treatment of that process subcategory effluent is the same. However, all of the process subcategory effluent streams at a mill will be monitored if the effluent streams do not undergo a final treatment.

Each mill will monitor several process subcategory effluent streams. On an industry wide basis, at least one representative effluent stream will be monitored from each process subcategory in those cases where similar effluent treatment methods are used and at least two representative effluent streams in those cases where different methods of effluent treatment are used. This will provide on-going validation of the approach chosen, as well as providing an indication of the effectiveness of one method of treatment versus another.

All final effluent streams, after final treatment, if any, will be monitored at each of the mills. Final effluents are to be monitored in order to provide an indication of the impact of contributing process subcategory effluent streams and to facilitate comparisons of the treatment methods applied across all of the mills. These comparisons will provide the basis for the development of treatment technology-based effluent limits.

The subcategorization-based approach necessitated the development of monitoring schedules specific to a process subcategory effluent. The routine monitoring requirements for each specific process subcategory effluent will be consistent across the mills and will reflect the nature of the processes and materials involved in that process subcategory.

The monitoring requirements for each final effluent stream are different for each mill. The requirements reflect those imposed on each of the process subcategory effluent streams which contribute to that final effluent stream.

Biological monitoring of the final effluents is also required and provides a correlation with the chemical monitoring data.

VII DATABASES USED FOR PARAMETER SELECTION

A voluntary pre-regulatory monitoring program was established with the iron and steel sector with a view to obtaining the effluent characteristics of similar unit operations or process subcategories in Ontario iron and steel plants.

The primary objective of the pre-regulation monitoring program was to provide a data base on effluent characterization for process and final effluents from each iron and steel plant.

The principles of cokemaking, ironmaking, steelmaking (wet) or other steel finishing operations are similar among iron and steel mills. The pre-regulatory monitoring program was therefore focused on obtaining information from representative process subcategories as well as from final effluents.

In applying this monitoring strategy, it was necessary to monitor some of the effluent streams that discharge to municipal sewer systems (ie. indirect dischargers) in order to obtain representative monitoring data on each type of process subcategory.

In addition to pre-regulatory monitoring data, environmental studies by the United States EPA (4) and studies such as the Upper Great Lakes Connecting Channels Study (5), the St. Mary's River MISA Pilot Site Study (6), the study on Point Source Loadings of Priority Pollutants to and from Hamilton Harbour (7), the Niagara River Toxic Committee Report (8) and the Impact of Hamilton Harbour on Western Lake Ontario study (9) and surveys conducted by Environment Canada on selected Iron and Steel Mills (10) provide data from which it is possible to construct a comprehensive database on iron and steel effluent quality.

VIII PRE-REGULATION MONITORING

Visits were made to collect wastewater samples before and after treatment in the period November 1987 to May 1988. Industrial intake waters were also monitored to determine the presence of conventional as well as priority pollutants. Priority pollutants are defined as those chemicals which are included on the Ontario Effluent Monitoring Priority Pollutants List (11).

The Effluent Monitoring Priority Pollutants List (EMPPL) includes those chemicals detected in Ontario municipal and industrial effluents and in Ontario waterways which pose a hazard to the receiving waterway and which pose a hazard to the receiving environment because of their toxicity and persistence.

During the pre-regulatory monitoring study, samples were collected from representative effluent streams of each process subcategory. A mill was not required to monitor a process subcategory effluent stream if a representative stream was monitored at another mill. The number of samples collected ranged from two samples for cold forming process operations to eleven samples for cokemaking operations. Wastewaters from cokemaking operations contain a wide variety of organic and inorganic pollutants and emphasis was, therefore, focused on monitoring these effluent streams. Other effluent streams such as final effluent streams, cooling water streams and storage site effluent streams were monitored on a site specific basis.

Samples consisted of four aliquot composites collected over a six hour period. All samples were analyzed for conventional parameters and parameters on the Effluent Monitoring Priority Pollutants List (EMPPL) that have known laboratory protocols. In addition, split samples were collected, from selected effluent streams, and analyzed by the Ontario Ministry of the Environment laboratory.

Appendix I, Table 1 shows the total number of effluent characterizations performed on process subcategory and final effluent streams. Sixty-two effluent characterizations (51 by industry and 11 by the MOE) were completed on effluents from the six iron and steel plants. Analyses for chlorinated dibenzo-p-dioxins and dibenzofurans were conducted on twelve effluent streams.

It should be noted that fifteen tests for the presence of dibenzo-p-dioxins and dibenzofurans were conducted by the Iron and Steel Sector and the Ministry of the Environment during the pre-regulatory study. None of these tests indicated the presence of dioxins and furans in iron and steel effluent.

Open characterizations were conducted by the iron and steel sector on 5 process subcategory effluent streams, 1 final effluent stream and 1 storage site effluent stream.

The frequency of detection of compounds on EMPPL for each process subcategory and final effluent stream are shown in Appendix I, Table 2.

The following analytical test groups contain priority pollutant parameters that were detected in process subcategory and final effluent streams during the pre-regulation monitoring study in concentrations greater than their Ministry of the Environment Analytical Method Detection Limits:

Total Metals	(ATG 9)
Hydrides	(ATG 10)
Mercury	(ATG 12)
Halogenated Volatiles	(ATG 16)
Non-halogenated Volatiles	(ATG 17)
Base Neutral Extractables	(ATG 19)
Acid Extractables	(ATG 20)
Chlorinated Neutral Extractables	(ATG 23)

Appendix I, Table 3 shows the parameters that were above Ministry of the Environment Analytical Method Detection Limits in process and final effluent streams during the pre-regulation monitoring study.

The following analytical test groups were not monitored for during the pre-regulation monitoring study:

Group 13 (Total Alkyl Lead)
Group 21 (Extractables, Phenoxy Acid Herbicides).
Group 22 (Extractables, Organochlorine Pesticides)

Analytical test groups 13, 21 and 22 are not used in or generated by iron and steelmaking processes. In addition, these test groups were not considered by the U.S EPA during the development of their Effluent Limitations, Guidelines and Standards (4).

IX PARAMETERS FOR ROUTINE MONITORING

This section deals with the development and use of the Iron and Steel Sector List and the Candidate Parameter for Control List.

The Iron and Steel Sector List includes the analytical test groups that contain the conventional and priority pollutants that are found in iron and steelmaking process subcategory and final effluent streams. The Sector List is based on pre-regulation monitoring data, United States Environmental Protection Agency (EPA) data, historical data and technical knowledge of iron and steelmaking processes.

The Sector List is used for the purposes of effluent characterization (see Section XIX).

A subset of the Iron and Steel Sector List is the Candidate Parameter for Control List which is used for routine monitoring.

The Candidate Parameter for Control List consists of chemicals that are currently regulated by the U.S EPA for the iron and steel industry.

Candidate parameters for control are analyzed frequently to establish an effluent database. The United States EPA has found that by limiting the discharge of these candidate parameters in final effluent streams, effective control should be provided for toxic pollutants. Candidate parameters for control are assigned to specific process subcategories based on pre-regulatory data and on technical knowledge of individual processes.

The Ontario Iron and Steel Sector List

The Iron and Steel Sector List is made up of analytical test groups which include the pollutants that were detected during pre-regulation monitoring and which historical data have indicated are present in wastewaters from iron and steelmaking industries.

The Iron and Steel Sector List contains analytical test group 24 (Chlorinated Dibenzo-p-dioxins and Dibenzofurans) and analytical test group 27 (Polychlorinated Biphenyls). There is no historical data to suggest that iron and steelmaking processes produce contaminants that belong to either of these two analytical test groups. However, the industry will monitor for these contaminants because of their environmental importance.

The Iron and Steel Sector list consists of the following analytical test groups:

Group 2	Cyanide
Group 3	Hydrogen Ion (pH)
Group 4	Nitrogen
Group 5	Organic Carbon
Group 6	Total Phosphorus
Group 7	Specific Conductance
Group 8	Suspended Solids
Group 9	Total Metals
Group 10	Hydrides
Group 11	Chromium Hexavalent
Group 12	Mercury
Group 14	Phenolics
Group 15	Sulphide
Group 16	Volatiles, Halogenated
Group 17	Volatiles, Non-Halogenated
Group 19	Base Neutral Extractables
Group 20	Acid Extractables
Group 23	Extractables, Chlorinated
Group 24	Chlorinated Dibenzo-p-dioxins and Dibenzofurans
Group 25	Solvent Extractables
Group 26	Fatty and Resin Acids
Group 27	Polychlorinated Biphenyls

Chemical oxygen demand (analytical test group 1) is not included on the Iron and Steel Sector List because it is not as specific an indicator for iron and steel effluent quality as Dissolved Organic Carbon (analytical test group 5a). Dissolved organic carbon measures the soluble organic carbon and can be detected at a lower detection limit.

As previously mentioned, total alkyl lead (analytical test group 13), herbicides (analytical test group 21), and pesticides (analytical test group 22) are not produced by iron and steelmaking processes and are, therefore, not included on the Iron and Steel Sector List.

Water Soluble Volatiles (analytical test group 18) were not detected in the 48 samples that were analyzed during the pre-regulatory monitoring study. Therefore, analytical test group 18 is not included on the Iron and Steel Sector List.

Analytical test groups from the Iron and Steel Sector List which contain priority pollutants have been assigned to specific process subcategories based on the parameters that exceeded their Ministry of the Environment Analytical Method Detection Limits during the pre-regulatory monitoring study, United States Environmental Protection Agency (EPA) data, and on technical knowledge of individual processes. These analytical test groups are monitored in order to establish the presence/absence of toxic compounds and to identify possible candidate compounds for high frequency monitoring and control.

The analytical test groups from the Iron and Steel Sector List that contain priority pollutants have been assigned as follows:

Cokemaking	Total Metals	(ATG 9)
	Hydrides	(ATG 10)
	Mercury	(ATG 12)
	Halogenated Volatiles	(ATG 16)
	Non-halogenated Volatiles	(ATG 17)
	Base Neutral Extractables	(ATG 19)
	Acid Extractables	(ATG 20)
	Chlorinated Neutral Extractables	(ATG 23)
Ironmaking/ Sintering	Total Metals	(ATG 9)
	Hydrides	(ATG 10)
	Halogenated Volatiles	(ATG 16)
	Non-halogenated Volatiles	(ATG 17)
	Acid Extractables	(ATG 20)
Steelmaking (wet)	Total Metals	(ATG 9)
	Halogenated Volatiles	(ATG 16)
	Base Neutral Extractables	(ATG 19)
	Acid Extractables	(ATG 20)
	Chlorinated Neutral Extractables	(ATG 23)
Hot Forming	Total Metals	(ATG 9)
	Halogenated Volatiles	(ATG 16)
	Base Neutral Extractables	(ATG 19)
	Chlorinated Neutral Extractables	(ATG 23)
Cold Forming/ Acid Pickling	Total Metals	(ATG 9)
	Hydrides	(ATG 10)
	Halogenated Volatiles	(ATG 16)
	Chlorinated Neutral Extractables	(ATG 23)
Salt Bath Descaling	Total Metals	(ATG 9)
	Hydrides	(ATG 10)
	Hexavalent Chromium	(ATG 11)
	Halogenated Volatiles	(ATG 16)
	Chlorinated Neutral Extractables	(ATG 23)

The Ontario Iron and Steel Candidate Parameter for Control List

The Ontario Iron and Steel Candidate Parameter for Control List consists of those chemicals, with the exception of tetrachloroethylene and chlorine residual, that are currently regulated by the United States Environmental Protection Agency for the U.S. Iron and Steel Industry.

Tetrachloroethylene was deleted from the Candidate Parameter for Control List because it was not detected at any of the sampling locations during the preregulatory monitoring study and it is not used by any of the iron and steel mills in Ontario.

Chlorine residual was deleted from the Candidate Parameter for Control List because of the analytical interference of other compounds such as halogens during laboratory analysis. Interference may result in extraordinarily high levels of chlorine residual which could be misleading.

It should be noted that iron is not regulated by the U.S. EPA or considered as a candidate parameter for control because iron is not an "indicator" parameter for the presence of other metals and is not a priority pollutant like chromium, hexavalent chromium, lead, nickel and zinc.

The following compounds comprise the Candidate Parameter for Control List for the Ontario Iron and Steel Industry:

Benzene	Naphthalene
Benzo(a)pyrene	Chromium
Hexavalent Chromium	Lead
Nickel	Zinc
Ammonia	Cyanide
Oil and Grease	Phenolics (4AAP)
Suspended Solids	pH

Although most of the total metals were found frequently, zinc, lead, chromium and nickel were selected as candidate parameters for control because:

- zinc is highly toxic with a 96 hr. LC50 that varies from 0.1 to 1.0 mg/l (11).
- lead is highly toxic with a 96 hr. LC50 of 0.1 to 1.0 mg/l (11).
- chromium and nickel are characteristic of specialty steel and mini-mill process effluents.

Lead and zinc removal from effluent streams will ensure a comparable removal of other metals. Similarly, the removal of benzene which is an indicator for the presence of non-halogenated volatiles, benzo(a)pyrene and naphthalene which are indicators for the presence of base-neutral extractables and phenolics (4AAP) which is an indicator for acid-extractables should result in comparable control of the other toxic pollutants (4).

Chemicals from the Candidate Compounds for Control List have been assigned to specific process subcategories based on pre-regulatory monitoring data and on technical knowledge of the individual processes.

Candidate compounds for control have been assigned to process subcategories as follows:

Cokemaking	Ammonia Benzene Benzo(a)pyrene Cyanide Naphthalene Oil and Grease Phenolics (4AAP) Suspended Solids
Sintering	Ammonia Cyanide Phenolics (4AAP) Suspended Solids
Ironmaking	Ammonia Cyanide Phenolics (4AAP) Suspended Solids Zinc
Steelmaking (wet process)	Lead Oil and Grease Suspended Solids Zinc
Hot Forming	Lead/Nickel/Chromium* Oil and Grease pH Suspended Solids Zinc
Salt Bath Descaling	Hexavalent Chromium Nickel pH Suspended Solids

Acid Pickling	Chromium Oil and Grease Lead pH Suspended Solids Zinc
Cold Forming	Chromium Lead Oil and Grease pH Suspended Solids Zinc

* For Specialty Steel Mills, the parameter lead will be replaced by nickel and chromium because nickel and chromium are generated during descaling operations.

X CLASSIFICATION OF EFFLUENTS

Iron and steelmaking wastewaters are usually treated individually at the process subcategory effluent level. Final or central treatment is sometimes provided in order to further treat several or all process subcategory effluent streams. Iron and steel effluent streams are classified as follows:

Process subcategory effluents
Final effluents
Cooling water
Storm water
Storage site effluent
Emergency overflow effluent

The Iron and Steel Sector Effluent Monitoring Regulation defines final effluent streams in order to point out that these streams discharge directly to the receiver after final treatment. Final effluent steams may include cooling water, storm water and waste disposal site effluents.

XI FLOW MEASUREMENT

Accurate flow measurements are essential for the determination of contaminant loadings to surface watercourses. Flows of process subcategory effluent streams for new flow measurement devices will be measured continuously with an accuracy of plus or minus 5% of the actual flow for the primary measuring devices (ie. sharp crested weirs and orifice plates) and plus or minus 2% of the full scale flow for the secondary devices (ie. stage measuring device, signal processors and integrators). The combined accuracy of the flow measurement systems will be within plus or minus 7% of the actual flow at full scale.

The accuracy of the systems will be 9% of the actual flow at one half of the design flow and 13% of the actual flow at one quarter of the design flow. Therefore, process subcategory effluent flows will be measured within plus or minus 7% and plus or minus 13% of the actual flowrate for the design range of the measuring system.

Existing flow measurement devices should meet the above flow measurement requirements unless flow calibration indicates that these devices are not capable of achieving the required flow measurement accuracy. In these cases an accuracy of plus or minus 15% of the actual flow or better will be required.

Flows of final effluent streams will be continuously measured with an accuracy of plus or minus 20% of the actual flowrate.

In the event that the direct discharger is unable to measure the flow of a final effluent stream and where that stream receives measured flows from all contributing process subcategory effluent streams, the final effluent flow may be estimated with an accuracy of $\pm$ 20% of the actual flow. The estimate must be made at the time of sampling on three separate occasions over the twenty-four hour sampling period.

Although flow from these final effluent streams will be measured with an accuracy of plus or minus 20% or better, contaminant loadings to the receiver can still be calculated with a high degree of accuracy because process subcategory effluent streams that contribute to final effluent streams will be measured with the higher accuracy of plus or minus 7% of the actual flow.

This is consistent with the flow measurement requirements for combined effluent streams as defined in the General Effluent Monitoring Regulation (Ontario Regulation 695/88).

A decision as to the accuracy needed in the measurement of final effluent discharges will be made during the development of the Effluent Limits Regulation.

Flows of cooling waters, storm waters, emergency overflows and waste disposal site effluents must be measured at the time of sampling. The use of water balance calculations and pumping rates to estimate flow measurements is permitted provided that they are capable of accuracies of plus or minus 20% of the actual flow rate. These calculations should be verified by on-site calibration.

XII FREQUENCY ASSIGNMENT RATIONALE

The monitoring strategy has been designed with the aim of minimizing deviations from the true mean concentrations of the candidate compounds for control in order to obtain accurate effluent loadings.

As part of the St. Mary's River MISA Pilot Site Study (6) and the Upper Great Lakes Connecting Channels Study (5), an extensive data base has been established on the quality of the final effluent discharged from Algoma Steel to the St. Mary's River. This data base was used to estimate sample size requirements that minimize the variability in effluent concentrations.

By assuming that the mean value of several parameters is the same as the true mean, Table 4 illustrates the total number of grab samples required at a 95% confidence level for 5, 10, 15, 20 and 25 percent deviations from the data base true means.

It can be seen that a large number of grab samples are required in order to obtain a small deviation from the true mean. For example, one needs 136 samples of phenolics (4AAP) to estimate the mean within a range of 10% of the true population mean at a confidence level of 95% whereas only 22 samples are required for a 25% deviation.

It should be noted that composite samples will produce a deviation which is less than that estimated for the grab samples.

With an accuracy of 7% for flow measurements and an accuracy of 10% for the mean parameter concentrations, loading estimates will be obtained with an accuracy of about 15% (14). It is therefore important to obtain high accuracy for both flow and concentration measurements in order to achieve reliable loading estimates.

A lack of accuracy in loading estimates may lead to the promulgation of effluent limits which may cause unnecessary capital expenditures to the Ontario Iron and Steel Industry or may lead to lenient requirements.

In summary, statistically supportable data are needed in order to calculate daily and monthly average loadings for both conventional and priority pollutants.

XIII GENERAL PARAMETER/FREQUENCY ASSIGNMENT RULES

The following general rules have been established and used to develop a cost effective monitoring strategy that will generate meaningful data given the wide variation in plant sizes and processes in the Iron and Steel Industry.

A. The monitoring frequency for a given parameter is a function of the parameter type, the parameter concentration and stream classification.

B. Each process subcategory effluent stream will be monitored for parameters that are characteristic of that process subcategory operation.

C. Each final effluent stream will be monitored for the parameters that are associated with the process subcategory effluent streams that contribute to that final effluent stream.

D. Storm water, storage site, waste disposal site, and emergency overflow effluent stream will be monitored for a common set of parameters to facilitate a comparison of loadings with other effluents.

E. All sites must monitor for pH, suspended solids, specific conductance, dissolved organic carbon, oil and grease, total phosphorus, iron and total metals.

- These parameters reflect the general level of environmental control achieved at the plants and will be useful for plant comparison.
- The total metals reflect the nature of iron and steelmaking operations and products produced.
- These parameters are surrogates for other parameters or analytical test groups.
- These parameters are used by the Iron and Steel industry to assess the effectiveness of environmental control processes
- The diversity of the sector precludes the application of any one priority organic pollutant as a sector wide parameter.

F. Conventional and priority pollutants that are currently regulated by the United States Environmental Protection Agency for the U.S. Iron and Steel industry will be monitored at a high frequency.

- These pollutants were selected by the U.S EPA on the basis of analytical data gathered by the Agency, the environmental impact of each pollutant, the ability of the compound to serve as an "indicator" for the presence of other pollutants and the treatability of each compound.

- The regulated pollutants are candidate compounds for control and are assigned to process subcategories on the basis of pre-regulation monitoring data, studies conducted by the U.S. EPA and on technical knowledge of the individual processes.

G. Final effluent streams that receive unmonitored process subcategory effluent streams will be monitored for the iron and steel sector candidate compounds for control associated with those process subcategory effluent streams.

H. The analytical test groups that include candidate compounds for control which are also organic priority pollutants will be monitored monthly.

I. If a priority pollutant was detected above the Ministry of the Environment Method Detection Limit during the MISA pre-regulatory monitoring study then the analytical test group that includes that priority pollutant will be monitored monthly.

J. Parameters that are currently being monitored under IMIS, Certificate of Approval or Control Orders will be monitored at their existing frequency or higher.

K. Parameters that were detected during the MISA pre-regulatory monitoring study in process or final effluent streams at levels that were less than those in the intake waters will be monitored.

L. Plant sites with biological treatment will monitor for total phosphorus.

M. All sites will conduct toxicity testing on final effluent streams and cooling water streams.

A summary of frequency/parameter assignment rules is included in Appendix 1, Table 7.

XIV SPECIFIC PARAMETER/FREQUENCY ASSIGNMENT RULES

There are four basic frequencies of routine monitoring required by the Iron and Steel Sector Effluent Monitoring Regulation - daily, thrice weekly, weekly and monthly. Conventional and priority pollutants were assigned to each monitoring frequency on the following site specific and process specific basis:

Process Subcategory Effluent Thrice Weekly

1. Each process subcategory effluent stream will be monitored thrice weekly for the candidate parameters for control associated with that process subcategory.

    * Thrice weekly will provide a set of 12 data points for calculating statistically supportable monthly averages for compounds that are candidates for control.

2. Each process subcategory effluent stream with biological treatment will be monitored thrice weekly for Total Phosphorus (analytical test group 6).

    * Total Phosphorus is an indicator of plant performance.
    * Thrice weekly monitoring will help determine phosphorus utilization in biological treatment and will provide statistically supportable data for evaluating plant effectiveness.

Process Subcategory Effluent Monthly

3. Each process subcategory effluent stream will be monitored monthly for the analytical test groups that include organic priority pollutant candidate parameters for control.

    * To show whether candidate parameters for control which are monitored three times weekly are indicative of the presence of contaminants in corresponding analytical test groups.

Final Effluent Daily

4. Each final effluent stream will be monitored daily for a common set of parameters that includes pH, specific conductance, suspended solids and oil and grease.

    * Daily monitoring is required to assess parameters with high variabilities.
    * This common set of parameters will reflect the general minimum level of environmental control at the plant and will be useful for inter-plant comparisons.
    * Daily monitoring will provide insight into plant upset and spill conditions.

Final Effluent Thrice Weekly

5. Each final effluent stream, with the exception of those final effluent streams that receive monitored process subcategory effluents, will be monitored thrice weekly for the candidate parameters for control associated with the process subcategory effluent streams that contribute to that final effluent stream.

    * Thrice weekly monitoring for candidate parameters for control in final effluent streams that receive unmonitored process subcategory effluent streams will ensure that statistically supportable data for the compounds that are candidates for control will be obtained at all sites.

6. Each final effluent stream that is likely to contain soluble organics will be monitored thrice weekly for Dissolved Organic Carbon (analytical test group 5a).

    * Dissolved Organic Carbon is more likely to reflect trace organics than TOC, BOD_5, or COD.
    * Thrice weekly monitoring for Dissolved Organic Carbon will provide statistically supportable data to assess trace organics that may be associated with plant performance.

Final Effluent Weekly

7. Each final effluent stream that is not likely to contain soluble organics will be monitored weekly for Dissolved Organic Carbon (analytical test group 5a).

    * Weekly monitoring for Dissolved Organic Carbon was adopted for selected final effluent streams as a conservative approach to ensure that any trace organics will be detected.

8. Each final effluent stream will be monitored weekly for Total Phosphorus (analytical test group 6).

   * Weekly monitoring for Total Phosphorus is required to provide data for the International Joint Commission (IJC).

9. Parameters that are currently being monitored under IMIS, Certificates of Approval or Control Orders will be monitored weekly or at higher frequencies.

Final Effluent Monthly

10. Each final effluent stream will be monitored monthly for the analytical test groups which contain priority pollutants above MOE analytical method detection limits and are associated with the process subcategory effluent streams that contribute to that final effluent stream.

    * To show whether the presence of one member of an analytical test group is indicative of the presence of contaminants in corresponding analytical test groups.
    * To highlight compounds that may be candidates for control and to estimate their annual loadings.

Final Effluent Semi-annually

11. Each final effluent stream will be monitored twice per year for Chlorinated Dibenzo-p-dioxins and Dibenzofurans (analytical test group 24) and Polychlorinated Biphenyls (analytical test group 27) although they are not generated by iron and steelmaking processes.

    * To complement the existing Ministry of the Environment database which consists of fifteen tests for chlorinated dibenzo-p-dioxins and dibenzofurans and sixty-seven tests for PCB's.

XV MONITORING DATA APPLICATIONS

A) Process Subcategory Effluent Streams

This section deals with the allocation of candidate parameters for control to process subcategory effluent streams and the assignment of candidate parameters for control to specific monitoring frequencies.

* **Ammonia**

  Ammonia is usually found at high levels in wastewaters from by-product recovery coking operations and ironmaking/sintering operations prior to wastewater treatment.

  High ammonia levels in combination with cyanide and zinc are toxic to aquatic life and exert a high oxygen demand on receiving waters.

  Cokemaking and ironmaking/sintering process effluent streams will be monitored thrice weekly for ammonia.

* **Benzene**

  Benzene is generally recovered in the coke by-product plant and the residual is treated using biological treatment. Benzene is an indicator of the presence of non-halogenated volatiles.

  Benzene has demonstrated teratogenic effects in laboratory animals and mutagenic effects in humans and other animals.

  Cokemaking process effluent streams will be monitored thrice weekly for benzene and monthly for non-halogenated volatiles (analytical test group 17).

* **Cyanide**

  Cyanide is usually found in wastewaters from by-product recovery coking operations and ironmaking operations.

  Cyanide ions can combine with ammonia and zinc to form compounds which are toxic to aquatic life. The synergistic effects of cyanide with other metals results in the formation of more toxic complexes than with cyanide itself.

  Cokemaking, sintering and ironmaking process effluent streams will be monitored thrice weekly for cyanide

(analytical test group 2).

* **Oil and Grease**

Oil and grease are taken together as one pollutant parameter. Some oil and grease compounds are lubricants and cutting fluids and light hydrocarbons.

Lubricants and cutting fluids are generally either nonemulsifiable oils such as lubricating oils and greases or emulsifiable oils such as soluble oils, rolling oils, and cutting oils. Emulsifiable oils may contain fat, soap or various other additives.

Light hydrocarbons include light fuels such as gasoline, kerosene, and miscellaneous solvents used for industrial processing, degreasing or cleaning purposes.

Oil and grease is usually found in wastewaters from cokemaking, continuous casting, hot forming and acid pickling operations.

Oil and grease even in small quantities cause troublesome taste and odour problems. Fish and water fowl are adversely affected by oils as oil emulsions may adhere to the gills of fish causing suffocation.

Cokemaking, steelmaking, hot forming, acid pickling and cold forming effluent streams will be monitored thrice weekly for oil and grease. In addition, all final effluent streams will be monitored daily for oil and grease.

The presence of oil and grease may reflect incidents of plant spills or upsets.

* **pH**

pH is an indicator of operating efficiency. Hot forming, salt bath descaling, acid pickling and cold forming effluent streams will be monitored thrice weekly for pH. Effluents from these process subcategories have variable pH values whereas other effluents from other process subcategory operations have constant pH values.

In addition, all final effluent streams will be monitored daily for pH.

* **Phenolics (4AAP)**

Phenolics (4AAP) are found in cokemaking by-product plant and ironmaking/sintering process effluent streams. Phenolic analysis, using the 4-aminoantipyrene method (4AAP), is a useful indicator of the presence of acid extractable toxic organic pollutant.

High total phenolic concentrations may cause toxic effects to aquatic life and may also cause taste and odour problems in water supplies. Cokemaking and ironmaking/sintering process effluent streams will be monitored thrice weekly for phenolics (4AAP).

* **Polynuclear Aromatic Hydrocarbons (PAH's)**

PAH's are formed as a result of incomplete combustion when organic compounds are burned with insufficient oxygen. PAH compounds are found frequently in cokemaking process effluent streams.

Some polynuclear aromatic hydrocarbon compounds detected in cokemaking process effluent streams are carcinogenic (15).

Cokemaking process effluent streams will be monitored thrice weekly for naphthalene and benzo(a)pyrene. Cokemaking process effluent streams will also be monitored monthly for base neutral extractables (analytical test group 19).

* **Suspended Solids**

There are substantial quantities of particulates generated in the steelmaking process and contained in the process off-gases. As water is used to condition and clean these gases in the wet steelmaking process, the particulates are transferred to the process waters.

Suspended solids concentrations provide an indication of the degree to which the process wastewaters are contaminated and also an indication as to the degree of the wastewater treatment that is being achieved.

The removal of suspended solids from the effluent stream will result in the removal of certain toxic metals which are entrained in the suspended solids.

Suspended solids interfere with many industrial processes. When suspended solids settle to form sludge deposits on the stream or lake bed they often damage aquatic life by destroying benthic organisms that would otherwise occupy the habitat.

All process subcategory effluent streams will be monitored thrice weekly for suspended solids. All final effluent streams will be monitored daily for suspended solids.

* **Total Metals**

Total metals (analytical test group 9) will be monitored monthly at all final effluents.

* **Chromium**

Chromium and chromium compounds are used in the production of steel alloys and may also be used to inhibit corrosion. Chromium and chromium compounds are usually found in wastewaters from specialty steel hot forming operations, acid pickling operations and cold forming operations. The toxicity of chromium salt to aquatic life depends on pH, hardness and valence of the chromium and temperature.

Specialty steel hot forming process effluent streams, acid pickling process effluent streams and cold forming process effluent streams will be monitored thrice weekly for chromium.

* **Hexavalent Chromium**

Hexavalent Chromium is a carcinogen and can retard fish growth. Hexavalent chromium is usually found in wastewaters from salt bath descaling operations.

Salt bath descaling process effluent streams will be monitored thrice weekly for hexavalent chromium.

* **Lead**

Lead is usually found in wastewaters from steelmaking, hot forming, acid pickling and cold forming operations. Lead is toxic to aquatic life and is a carcinogen to some animal species.

Steelmaking, hot forming, acid pickling and cold forming process effluent streams will be monitored thrice weekly for lead.

* **Nickel**

Nickel is usually found in hot forming wastewaters from specialty steel mills. Nickel salts can kill fish at very low concentrations, however, nickel has been found to be less toxic to some fish than zinc.

Specialty steel hot forming effluent streams will be monitored thrice weekly for nickel.

* **Zinc**

Zinc is used as a protective coating on steel. It is applied by hot dipping (ie. dipping the steel in molten zinc) or by electroplating.

Zinc compounds can cause lethal effects to aquatic life. The additive or synergistic effects of zinc, ammonia and cyanide can result in toxic conditions which are greater than those of the original contaminant.

Zinc is usually found in wastewaters from ironmaking, steelmaking (wet), acid pickling, hot forming and cold forming operations.

Effluent streams associated with these process subcategories will be monitored thrice weekly for zinc.

B) **Final Effluent Streams**

Each final effluent stream will be monitored monthly for the analytical test groups which contain priority pollutants above MOE analytical method detection limits and are associated with the process subcategory effluent streams that contribute to that final effluent stream. Additional parameters to be monitored in final effluent streams are: dissolved organic carbon, iron and total phosphorus.

* **Dissolved Organic Carbon**

Dissolved Organic Carbon (DOC) is a measure of soluble organic loading to the receiving water.

DOC can be detected at a lower detection limit (0.5 mg/l) as compared to that of Total Organic Carbon (5 mg/l) and that of Chemical Oxygen Demand (10 mg/l). Monitoring of DOC will facilitate a comparison of loadings among all industrial sectors.

All final effluents will be monitored thrice weekly for Dissolved Organic Carbon.

* **Iron**

Iron is the basic element in the production of steel. Iron is currently monitored for at all MISA iron and steel mills under IMIS. Final effluent streams will be monitored weekly for iron. A higher monitoring frequency was not considered for iron because, as previously mentioned, it is not an indicator compound.

* **Total Phosphorus**

  Phosphorus is added to biological treatment systems as a nutrient which aids in biological activity. Total phosphorus is currently monitored under IMIS at some of the mills in order to provide reporting data for the International Joint Commission.

  All final effluent streams will be monitored weekly for total phosphorus.

C) Monitoring Schedules

Monitoring Schedules which show the application of the monitoring strategy for each mill are included in Appendix II. These schedules identify process subcategory effluent, final effluent, cooling water, storm water effluent, waste disposal site effluent, storage site effluent and emergency overflow effluent streams for each mill.

These schedules also outline monitoring requirements and toxicity requirements for each stream.

D) Monitoring Data Use

Daily monitoring data will be used to:

* Calculate average daily concentrations and loadings.
* Identify average and maximum effluent limits for any one day.
* Establish a comparison among different sites.
* Identify upset and spill conditions both in magnitude and frequency.

Thrice weekly monitoring data will be used to :

* Calculate monthly loadings and concentrations.
* Provide a record of variability in process loadings and treatment plant upsets and spills.
* Aid in identifying well operated treatment plants which consistently control toxic contaminants and which could be considered as benchmarks for designation of BATEA.
* Establish the performance of treatment plants in comparison to EPA reference limits.
* Establish the suitability of controlling priority pollutants and conventional compounds in effluent streams.
* Establish a basis for inter-sector comparisons of loadings to the receiving water.

Weekly monitoring data will be used to :

* Evaluate the need for control of traditional contaminants such as iron and total phosphorus. Weekly monitoring is an economic and technical compromise between thrice weekly and monthly monitoring. The weekly monitoring frequency is inadequate for the derivation of effluent limits but will provide estimates of both concentrations and loadings which will assist in defining future monitoring requirements.

Monthly monitoring data will be used to :

* Show whether particular toxic contaminants monitored more frequently are representative of corresponding groups of toxic contaminants.
* Show whether control of representative toxic contaminants will provide control of their corresponding analytical test groups.
* Identify contaminants of concern which may require more frequent monitoring.
* Provide information on the presence of toxic contaminants to be considered with the monthly toxicity testing results.

XVI COOLING WATER

Cooling water is non-contact water and should not contain contaminants associated with process subcategory effluent streams. However, in order to ensure that cooling waters are not contaminated, they will be monitored monthly for parameters that are representative of iron and steelmaking processes.

Cooling waters for integrated iron and steel mills will be monitored monthly for the following parameters:

Ammonia	Chromium
Cyanide	Dissolved Organic Carbon
Iron	Lead
Oil and Grease	pH
Phenolics (4AAP)	Suspended Solids
Total Phosphorus	Zinc

Some of these compounds are candidate compounds for control. The presence of organic priority pollutants in cooling water streams will be monitored during cooling water characterization.

Cooling waters for specialty steel and mini-mills will be monitored monthly for the following parameters:

Chromium	Dissolved Organic Carbon
Iron	Lead/Nickel
Oil and Grease	pH
Suspended Solids	Total Phosphorus
Zinc	

Ammonia, cyanide and phenolics (4AAP) are not included in specialty steel and mini-mill cooling water monitoring requirements because there are no cokemaking, sintering or ironmaking operations at these sites.

XVII STORM WATER

The main purpose of monitoring storm water discharges is to compare the loadings from storm water events with those from final effluent discharges. This comparison will help assess the relative significance of storm water as a source of contaminant loading from iron and steel mills.

Storm waters from integrated iron and steel mills will be monitored monthly for the following parameters:

Ammonia	Benzene
Benzo(a)pyrene	Chromium
Cyanide	Iron
Lead	Naphthalene
Oil and Grease	pH
Phenolics (4AAP)	Suspended Solids
Zinc	

Storm waters from specialty steel and mini-mills will be monitored monthly for the following parameters:

Iron	Lead/Nickel
Oil and Grease	pH
Suspended Solids	Zinc

Ammonia, benzene, benzo(a)pyrene, cyanide, naphthalene and phenolics (4AAP) are not included in specialty steel and mini-mill storm water monitoring requirements because there are no cokemaking, sintering or ironmaking operations at these sites.

XVIII STORAGE SITE EFFLUENT, WASTE DISPOSAL SITE EFFLUENT AND EMERGENCY OVERFLOW EFFLUENT

As with stormwater monitoring, the monitoring of storage site effluents, waste disposal site effluents and emergency overflow effluents will help assess their significance as sources of contaminant loading.

The parameters that will be monitored for these effluents will be the same as those in the candidate parameters for control list in order to allow a direct comparison of loadings with other effluents.

Storage site effluents and waste disposal site effluents will be monitored during the time of discharge with the provision that the collection frequency shall not exceed twice per month or twelve times per year.

Emergency overflow effluents will be monitored on an event basis.

XIX CHARACTERIZATION AND OPEN CHARACTERIZATION

Characterization of iron and steel mill effluents, using consistent and uniform sampling and analytical protocols, is required in order to determine the presence or absence of priority pollutants.

As the analytical methods for the characterization are expensive and with the prior knowledge that most pollutants are likely to be at low concentrations, the criterion used to estimate the frequency of characterization is based on the statistical presence/absence of a contaminant.

Characterizations must be able to detect compounds that may be present infrequently but may have the potential of adversely affecting the environment. For a given parameter that is present 10% of the time, the characterization should be able to detect that parameter at a probability of 50% or better. With ten characterizations the probability of detecting a pollutant that is present in an effluent stream 10% of the time is 65% at a confidence level of 95% (Table 5).

For the purpose of characterization, Iron and Steel analytical test groups have been assigned to integrated iron and steel mills and to specialty steel and mini-mills.

The analytical test groups that form the integrated iron and steel mill characterization list are:

Group 2	Cyanide
Group 3	Hydrogen Ion (pH)
Group 4	Nitrogen
Group 5	Organic Carbon
Group 6	Total Phosphorus
Group 7	Specific Conductance
Group 8	Suspended Solids
Group 9	Total Metals
Group 10	Hydrides
Group 11	Chromium Hexavalent
Group 12	Mercury
Group 14	Phenolics (4AAP)
Group 15	Sulphide
Group 16	Volatiles, Halogenated
Group 17	Volatiles, Non-Halogenated
Group 19	Base Neutral Extractables
Group 20	Acid Extractables
Group 23	Extractables, Chlorinated
Group 24	Chlorinated Dibenzo-p-dioxins and Dibenzofurans
Group 25	Solvent Extractables
Group 26	Fatty and Resin Acids
Group 27	PCBs (Total)

The analytical test groups that form the specialty steel and mini-mill characterization list are:

Group 3	Hydrogen Ion (pH)
Group 4	Nitrogen
Group 5	Organic Carbon
Group 6	Total Phosphorus
Group 7	Specific Conductance
Group 8	Suspended Solids
Group 9	Total Metals
Group 10	Hydrides
Group 11	Chromium Hexavalent
Group 16	Volatiles, Halogenated
Group 17	Volatiles, Non-Halogenated
Group 19	Base Neutral Extractables
Group 20	Acid Extractables
Group 23	Extractables, Chlorinated
Group 24	Chlorinated Dibenzo-p-dioxins and Dibenzofurans
Group 25	Solvent Extractables
Group 27	PCBs (Total)

Cyanide (Group 2), Mercury (Group 12), Phenolics (4AAP) (Group 14), and Sulphide (Group 15) are not included on the specialty steel and mini-mill characterization list because they are not produced by nor introduced to specialty steel and mini-mill processes and unit operations.

Fatty and Resin Acids (Group 26) have also been excluded from the specialty steel and mini-mill characterization list because fatty acids are applied only to cold forming operations. There are no cold forming operations at specialty steel mills and mini-mills in Ontario.

When a wastewater sample is analyzed by Gas Chromatography/Mass Spectrometry (GC/MS) it is not uncommon to detect numerous compounds. When samples are routinely analyzed for priority pollutants, an analyst will search for a target list of compounds and confirm the presence or absence of these substances. To accomplish this, the GC/MS instrument is programmed to identify target compounds and by analyzing standards containing known concentrations of these compounds, quantification is also accomplished.

Effluent samples are usually analyzed for:

1. A specific target list of compounds on a quantitative basis using specified analytical method detection limits.
2. Other compounds that may be present on a qualitative basis with a detection limit of 1 to 10 ppb.

It is therefore possible to make a definite statement concerning the type of compounds that are and are not detected and to provide quantitative information for a predetermined list of compounds.

The characterization of iron and steel final effluent streams will be divided into four characterizations where target compounds will be analyzed (except for analytical test groups 24 and 27) and four open characterizations where target and non-target compounds will be analyzed.

The characterizations and the open characterizations will be conducted during different months in order to gain insight into different plant operating conditions and seasonal variability of plant treatment processes.

The analytical method detection limits for the open characterizations should conform with those listed in the General Effluent Monitoring Regulation (Ontario Regulation 695/88) for the target compounds in the analytical test groups 16, 17, 19, 20 and 23. Therefore, analytical test groups 16, 17, 19, 20 and 23 will be characterized eight times during the one year monitoring period.

Parameters from analytical test groups 16, 17, 19, 20 and 23 are commonly found in integrated iron and steelmaking wastewaters. Parameters from analytical test groups 17 and 20 are not found in wastewaters from specialty steel and mini-mill operations, however, they were included in the characterization requirements as they are reported as part of the characterization analyses for analytical test groups 16 and 19.

The eight characterizations for analytical test groups 16, 17, 19, 20 and 23, together with two Ministry of the Environment characterizations that will be conducted during the regulation period, will ensure that a total of 10 characterizations will be conducted on each final effluent stream for these test groups.

In order to quantify target compounds at the analytical method detection limits specified in the General Effluent Monitoring Regulation, the following conditions must be met:

- no chemical clean-up is used;
- standards must be available for the target compounds;
- recoveries and response factors for the target compounds must be obtained by spiking organic free water;
- target compounds must be quantified relative to the same internal standards used in the sector list characterizations. These concentrations are quantitative. Quantitations are based on one-to-one compound calibration;
- Non-target compounds are quantitated relative to the same internal standards used in the open characterization. These concentrations are semi-quantitative;

Characterization of cooling water for the site-specific characterization list will be conducted quarterly (except for analytical test groups 24 and 27) in order to identify any contaminants that may be present in cooling water streams due to cross-contamination with process subcategory effluent streams. Quarterly characterization will provide a probability of 94% for detecting compounds 50% of the time at a 95% confidence level.

DIOXINS AND PCB'S

Analytical test group 24 (Chlorinated dibenzo-p-dioxins and dibenzofurans) will only be characterized semi-annually because of its high analysis cost and the low probability of detecting group members in iron and steel mill effluents.

Fifteen characterization tests for dibenzo-p-dioxins and dibenzofurans were conducted by the Iron and Steel Sector and the Ministry of the Environment during the pre-regulatory study. These tests indicated that dioxins and dibenzofurans

are not present in iron and steel wastewaters.

Polychlorinated biphenyls (analytical test group 27) are not generated by iron and steelmaking processes and are unlikely to be present in wastewaters from these operations.

Polychlorinated biphenyls were not detected above the Ministry of the Environment Analytical Method Detection Limit in the sixty-seven PCB characterizations which were conducted during the pre-regulatory monitoring study. Characterizations for analytical test group 27 will also be conducted semi-annually.

XX TOXICITY TESTING

In moving towards the reduction of contaminant loadings to the environment, efforts will be made to prohibit discharges of persistent toxic pollutants. With the sole use of single chemical effluent loading limits it is difficult to characterize effluent toxicity with adequate precision. Toxicity testing has the advantage that it considers the interaction that may occur between the various components of a waste stream.

Final effluents will be subject to two different types of toxicity tests: The 96 hour LC50 using Rainbow Trout and the 48 hour LC50 using Daphnia magna. Ministry of the Environment protocols for these toxicity tests must be used and are available from the Ministry (16,17).

Table 6 illustrates that with either twelve fish toxicity tests or twelve Daphnia magna toxicity tests, the probability of detecting a toxic effluent is 0.9998. Therefore, the Daphnia magna test and the fish toxicity test will each be carried out monthly.

The frequency of fish toxicity can be calculated using statistical analysis. Given an effluent that is marginally toxic and which will kill exactly 50% of the fish, the probability of identifying this effluent as toxic in 3 tests is 0.8750 (P50KILL for N = 3 see Table 6). The probability of failing to identify it as toxic is 1 - 0.8750 = 0.125.

Since probability values range from 0 to 1.0, a value of 0.875 is acceptable in order to correctly identify a toxic effluent from 3 tests. Therefore, in the event that three consecutive tests prove to be non-lethal, it is justifiable to conduct monthly toxicity tests on undiluted effluents for pass/fail purposes only.

If more than two fish die during a pass/fail test then toxicity tests using full series dilution will be conducted monthly until the effluent proves to be non-toxic for three consecutive months.

XXI QUALITY ASSURANCE/QUALITY CONTROL

Quality assurance and quality control (QA/QC) encompass all of the procedures undertaken to ensure that the data produced are generated within known probability limits of accuracy and precision.

Quality assurance is the overall verification program which provides producers and users of data the assurance that predefined standards of quality at predetermined levels of confidence are met. Quality assurance is comprised of two elements: quality control and quality assessment.

Quality control is the overall system of guidelines, procedures and practices which are designed to regulate and control the quality of products or services with regards to previously established performance criteria and standards.

Quality assessment is the overall system of activities which ensure that quality control is being performed effectively. This is carried out immediately following quality control and involves evaluating and auditing quality control data to ensure the success of the quality control program.

QA/QC is one of the most important aspects of the MISA monitoring regulations. The QA/QC program includes many small but essential activities ranging from proving the cleanliness of sample bottles, using proper sampling equipment, containers and preservatives to instrument calibration; validation of authenticity of standards, inclusion of blanks, spikes and controls in analytical runs to documenting performance; participation in external round-robins to defining the proper method for reporting a final data number. Omission of one of these activities can lead to unreliable data resulting in improper conclusions and perhaps inappropriate actions.

The financial stakes riding on the monitoring regulation data are too high to compromise the generated data with inadequate QA/QC.

Quality control monitoring provides information about the quality of the effluent samples collected and whether contamination, either during sampling or transportation, has occurred. Quality control is initiated at different effluent sampling streams based on the complexity of the effluent constituents. Quality control samples are collected at one process subcategory effluent stream, final effluent stream and cooling water stream per plant site.

Emphasis was placed on quality control for cokemaking process subcategory effluent streams and final effluent streams that receive cokemaking process subcategory effluents. Cokemaking unit operations produce complex effluents which contain a variety of organic and inorganic pollutants. In addition, cokemaking operations are the major source of organic pollutants that are generated during the iron and steelmaking making process.

Quality control monitoring for cooling water will provide a reference against which a comparison can be made in the event that monitoring of the cooling water effluent stream shows that cross-contamination has occurred with process subcategory effluent streams.

XXII ECONOMIC IMPLICATIONS OF THE REGULATION

The monitoring and abatement requirements under the MISA program will require both operating and capital expenditures. The Policy and Planning Branch of the Ministry has produced two reports which assess the economic environment of the iron and steel sector and analyze the financial implications of the incremental costs of monitoring imposed by the MISA monitoring requirements.

The first report entitled "Iron and Steel Sector Profile" (18) contains an economic assessment and analysis of the iron and steel sector based on publicly available data, information on domestic and international iron and steel operations and company data on the plants that are classified as direct dischargers. This sector profile included plants which were identified as direct dischargers as of October, 1986 and thus does not include assessments of Lake Ontario Steel Company (LASCO) and Ivaco Rolling Mills.

The report concludes that Ontario iron and steel mills which are of concern to MISA face different market prospects based on the nature of their products, the outlook for the end-user markets and their cost structures. The overall prospects for domestic steel consumption in Canada suggest that growth will be modest and that much of the demand may be filled by imports.

The second report entitled "Ontario's Iron and Steel Sector - Monitoring Cost Estimates" (19) presents estimates and implications of the incremental costs to the Iron and Steel Sector of the Effluent Monitoring Regulation requirements. These estimates were developed with the participation of industry representatives.

Incremental capital costs for the iron and steel plants which are direct dischargers subject to MISA monitoring requirements are estimated to be $4.9 million, and range from $2.9 to $6.9 million using an uncertainty factor of +/- 40%.

Operating costs over the 12-month period of the regulation range from $1.6 to $2.9 million, depending on the lab prices companies will have to pay for analytical testing.

The total estimated incremental cost of the MISA monitoring requirements including both capital and operating expenses for the Iron and Steel Sector ranges from $4.5 to $9.8 million.

Estimates of the incremental costs by plant are presented in Appendix I, Table 8.

Analysis of these cost estimates indicates that if all the Iron and Steel Sector plants had to monitor for a common list of contaminants, as the Petroleum Sector refineries must, the total cost of routine monitoring for the Iron and Steel Sector would $4.6 million as opposed to $1.7 million under the waste stream-specific requirements of the Monitoring Regulation. This represents a cost saving of $2.9 million and is a measure of the cost-effectiveness of the process-specific approach proposed for the Iron and Steel Sector.

As shown in Appendix I, Table 9, the economic impacts of the estimated monitoring costs on the Iron and Steel Sector are small in relation to aggregate sectoral financial indicators. For example, the incremental operating costs of monitoring amount to between 0.1% and 3% of the annual average after-tax profits earned by these companies between 1981 and 1987. When earnings were at their lowest, operating costs due to monitoring would have represented between 0.3% and 2.6% of the companies' annual after-tax earnings.

Incremental capital costs of monitoring represent between 0.01% to 1% of the companies' annual average capital expenditures for the period 1981-1987.

For the year in which the companies' capital expenditures were at their lowest for the period, capital costs associated with monitoring represent between .01% and 5.5% of capital expenditures.

Potential benefits to the firms of the monitoring regulation include gains in productivity by improving processes, reduction in water usage in manufacturing processes and in raw material losses in wastewater, and goodwill gained by demonstrating to the public that the firm is responding to environmental problems.

The monitoring regulation may have a small, but positive impact on employment in the steel industry because extra staff may be needed to take samples, maintain equipment and report data. The monitoring requirements will stimulate demand for laboratory services and flow measurement and sampling equipment. The monitoring database will be available to design cost-effective control programs aimed at virtual elimination of toxic contamination where it occurs.

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(18) The Coopers and Lybrand Consulting Group, "Iron and Steel Sector Profile", A report prepared for the Policy and Planning Branch, Ontario Ministry of the Environment, November, 1987.

(19) Ontario Ministry of the Environment, "Ontario's Iron and Steel Sector Monitoring Cost Estimates", Draft No. 2., November, 1988.

APPENDIX I

TABLE 1: IRON AND STEEL PRE-REGULATION MONITORING EFFLUENT CHARACTERIZATIONS

SITE	STREAM	# OF CHARACTERIZATIONS		DIOXINS	
		INDUSTRY	MOE	INDUSTRY	MOE
Atlas	Intake	1	-	1	-
	Final Effluent	3	1	1	-
LASCO	Intake	1	-	-	-
	Final Effluent	2	1	1	1
Dofasco	Intake	1	-		
	Coke Making Influent	3	3	1	
	Coke Making Effluent	3	2	1	
	Steel Making Influent	1	-		
	Steel Making Effluent	3	-	1	-
	Hot Forming Influent	1	-		
	Hot Forming Effluent	3	-	1	-
	Cold Forming Influent	1	-		
	Cold Forming Effluent	1	-		
Stelco Hilton	Intake	3	-	1	-
	Iron Making	3	3	1	1
	Oil Treatment Plant Effluent	3	-	1	-
	Hot Forming Influent	2	-		
	Hot Forming Effluent	2	-		
	Final Effluent	3	1	1	-
	Cooling Water	2	-		
	Weak Ammonia Liquor (coke by-product effluent)	2	-		
Stelco Lake (Erie Works)	Intake	1	-		
	Final Effluent	2	-	1	-
	Process Effluent	2	-	1	-
	East Storage Lagoon	1	-		
Algoma Steel*	Coke Making	1	-		
	Cold Mill	1	-		
	Cooling Water	3	-		
	Final Effluent	2	-		
	Hot Forming	1	-		

* Algoma Steel was monitoring during UGLCC Study and MISA Pilot Site Study.

TABLE 2: IRON AND STEEL PRE-REGULATION MONITORING FREQUENCIES OF DETECTION

ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED	COKE MAKING	IRON MAKING	STEEL MAKING WET	HOT FORMING	COLD FORMING	LASCO	ATLAS	ALGOMA FINAL EFFLUENT	STELCO HILTON WORKS	STELCO LEW PROCESS	STELCO LEW FINAL
9	Total metals	Aluminum	4/6	6/6	3/3	9/9	6/7	2/3	4/4	2/2	7/7	2/2	2/2
		Beryllium	0/6	1/6	0/3	0/9	0/7	0/3	ND/4	0/2	0/7	0/2	0/2
		Cadmium	3/6	2/6	1/3	3/9	3/7	1/3	ND/4	5/14	4/7	0/2	0/2
		Chromium	6/6	4/6	3/3	6/9	5/7	2/3	4/4	9/14	7/7	2/2	1/2
		Cobalt	1/6	1/6	0/3	1/9	3/7	0/3	0/4	0/14	1/7	0/2	0/2
		Copper	4/6	4/6	2/3	9/9	7/7	3/3	4/4	14/14	7/7	2/2	2/2
		Lead	1/6	6/6	3/3	9/9	6/7	2/3	4/4	14/14	7/7	2/2	2/2
		Molybdenum	3/6	3/6	3/3	5/9	5/7	2/3	4/4	2/2	6/7	2/2	2/2
		Nickel	5/6	4/6	3/3	9/9	5/7	3/3	4/4	5/14	7/7	2/2	2/2
		Silver	0/6	2/6	2/3	0/9	0/7	1/3	0/4	0/2	2/7	1/2	0/2
		Thallium	0/6	3/6	0/3	0/9	0/7	1/3	0/4	1/2	0/7	0/2	0/2
		Vanadium	5/5	1/6	1/3	0/9	0/7	0/3	0/4	0/2	2/7	0/2	0/2
		Zinc	5/6	6/6	3/3	6/9	5/7	2/3	4/4	14/14	7/7	2/2	2/2
10	Hydrides	Antimony	4/6	6/6	3/3	5/9	3/7	2/3	4/4	2/2	7/7	2/2	2/2
		Arsenic	6/6	6/6	3/3	9/9	7/7	2/3	4/4	13/14	7/7	2/2	2/2
		Selenium	6/6	4/6	3/3	5/9	1/7	1/3	2/4	2/2	6/7	1/2	2/2
11	Chromium (Hexavalent)	Chromium (Hexavalent)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
12	Mercury	Mercury	6/6	0/6	0/3	0/9	1/7	0/3	0/4	10/14	2/7	0/1	0/1
16	Volatiles, Halogenated	1,1,2,2-Tetrachloroethane	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/2	0/2
		1,1,2-Trichloroethane	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/2	0/2
		1,1-Dichloroethane	0/6	0/6	0/3	0/9	2/7	0/3	0/4	1/14	0/7	0/2	0/2
		1,1-Dichloroethylene	0/6	0/6	0/3	0/9	2/7	0/3	0/4	0/2	0/7	0/2	0/2
		1,2-Dichlorobenzene	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/2	0/2
		1,2-Dichloroethane (Ethylene dichloride)	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/14	0/7	0/2	0/2
		1,2-Dichloropropane	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/2	0/2
		1,3-Dichlorobenzene	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/2	0/2
		1,4-Dichlorobenzene	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/2	0/2
		Bromoform	0/6	1/6	0/3	1/9	0/7	0/3	0/4	0/2	0/7	2/2	2/2
		Bromomethane	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	1/2	0/2
		Carbon tetrachloride	1/6	1/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/2	0/2
		Chlorobenzene	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/14	0/7	0/2	0/2
		Chloroform	1/6	2/6	0/3	3/9	4/7	0/3	0/4	1/14	1/7	2/2	2/2
		Chloromethane	0/6	1/6	1/3	0/9	0/7	0/3	0/4	0/14	0/7	0/2	0/2

TABLE 2: IRON AND STEEL PRE-REGULATION MONITORING FREQUENCIES OF DETECTION

	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED	COKE MAKING	IRON MAKING	STEEL MAKING WET	HOT FORMING	COLD FORMING	LASCO	ATLAS	ALGOMA FINAL EFFLUENT	STELCO HILTON WORKS	STELCO LEW PROCESS	STELCO LEW FINAL
16	Volatiles, Halogenated (continued)	Cis-1,3-Dichloropropylene	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/14	0/7	0/2	0/2
		Dibromochloromethane	0/6	0/6	0/3	1/9	0/7	0/3	0/4	0/14	0/7	2/2	2/2
		Ethylene dibromide	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/14	0/7	2/2	2/2
		Methylene chloride	0/6	1/6	1/3	1/9	1/7	0/3	1/4	0/14	0/7	1/2	0/2
		Tetrachloroethylene (Perchloroethylene)	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/2	0/2
		Trans-1,2-Dichloroethylene	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/2	0/2
		Trans-1,3-Dichloropropylene	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/2	0/2
		Trichloroethylene	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/2	0/2
		Trichlorofluoromethane	0/6	0/6	0/3	0/9	0/7	0/3	2/4	0/2	0/7	0/2	0/2
		Vinyl chloride (Chloroethylene)	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/2	0/2
17	Volatiles, Non-Halogenated	Benzene	2/6	0/6	0/3	0/9	1/7	0/3	0/4	3/14	0/7	1/2	1/2
		Styrene	2/6	1/6	0/3	0/9	0/7	0/3	0/4	4/14	0/7	0/2	1/2
		Toluene	2/6	1/6	0/3	0/9	1/7	0/3	0/4	3/14	0/7	0/2	2/2
		o-Xylene	4/6	0/6	0/3	0/9	0/7	0/3	0/4	5/14	0/7	0/2	0/2
		m-Xylene and p-Xylene	5/6	0/6	0/3	0/9	0/7	0/3	0/4	6/14	0/7	0/2	0/2
18	Volatiles, Water Soluble	Acrolein	0/6	0/3	0/3	0/9	0/9	0/2	0/4	0/2	0/6	0/2	0/2
		Acrylonitrile	0/6	0/3	0/3	0/9	0/9	0/2	0/4	0/2	0/6	0/2	0/2
19	Extractables, Base Neutral	Acenaphthene	2/6	0/6	1/3	0/9	0/7	0/3	0/4	0/2	0/7	0/1	0/1
		5-nitro Acenaphthene	0/6	0/6	1/3	0/9	0/7	0/3	1/3	0/2	0/7	0/1	0/1
		Acenaphthylene	3/6	0/6	1/3	0/9	0/7	0/3	0/4	0/14	0/7	0/1	0/1
		Anthracene	4/6	0/6	2/3	0/9	0/7	0/3	1/4	0/14	0/7	0/1	0/1
		Benz(a)anthracene	6/6	0/6	1/3	1/9	0/7	0/3	1/4	0/14	0/7	0/1	0/1
		Benzo(a)pyrene	4/6	0/6	1/3	0/9	0/7	0/3	0/4	0/14	0/7	0/1	0/1
		Benzo(b)fluoranthene	3/6	0/6	1/3	0/9	0/7	0/3	1/4	0/2	0/7	0/1	0/1
		Benzo(g,h,i)perylene	3/6	0/6	0/3	0/9	0/7	0/3	0/4	0/14	0/7	0/1	0/1
		Benzo(k)fluoranthene	4/6	0/6	1/3	0/9	0/7	0/3	1/4	0/14	0/7	0/1	0/1
		Biphenyl											
		Camphene	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/1	0/1
		1-Chloronaphthalene	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/1	0/1
		2-Chloronaphthalene	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/1	0/1
		Chrysene	5/6	0/6	0/3	0/9	0/7	0/3	0/4	0/14	0/7	0/1	0/1
		Dibenz(a,h)anthracene	3/6	0/6	0/3	0/9	0/7	0/3	0/4	0/14	0/7	0/1	0/1
		Fluoranthene	6/6	1/6	2/3	1/9	0/7	0/3	1/4	0/14	0/7	0/1	0/1
		Fluorene	4/6	1/6	1/3	0/9	0/7	0/3	0/4	0/14	0/7	0/1	0/1

TABLE 2: IRON AND STEEL PRE-REGULATION MONITORING FREQUENCIES OF DETECTION

	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED	COKE MAKING	IRON MAKING	STEEL MAKING WET	HOT FORMING	COLD FORMING	LASCO	ATLAS	ALGOMA FINAL EFFLUENT	STELCO HILTON WORKS	STELCO LEW PROCESS	STELCO LEW FINAL
19	Extractables, Base Neutral (continued)	Indeno(1,2,3-cd)pyrene	2/6	0/6	0/3	0/9	0/7	0/3	0/4	0/14	0/7	0/1	0/1
		Indole	2/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/1	0/1
		1-Methylnaphthalene	2/6	0/6	1/3	0/9	0/7	0/3	0/4	0/2	0/7	0/1	0/1
		2-Methylnaphthalene	3/6	0/6	1/3	0/9	0/7	0/3	0/4	0/2	0/7	0/1	0/1
		Naphthalene	5/6	0/6	0/3	0/9	2/7	0/3	0/4	0/14	0/7	0/1	0/1
		Perylene	1/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/1	0/1
		Phenanthrene	5/6	2/6	3/3	1/9	0/7	0/3	1/4	0/2	0/7	0/1	0/1
		Pyrene	6/6	1/6	2/3	1/9	0/7	0/3	1/4	0/14	0/7	0/1	0/1
		Benzyl butyl phthalate	1/6	1/6	1/3	2/9	0/7	0/3	1/4	0/2	0/7	1/1	1/1
		Bis(2-ethylhexyl) phthalate	2/6	1/6	2/3	4/9	3/7	0/3	1/4	1/14	1/7	1/1	1/1
		Di-n-butyl phthalate	2/6	1/6	2/3	3/9	4/7	0/3	1/4	1/14	0/7	0/1	0/1
		4-Bromophenyl phenyl ether	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/1	0/1
		4-Chlorophenyl phenyl ether	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/1	0/1
		Bis(2-chloroisopropyl)ether	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/1	0/1
		Bis(2-chloroethyl)ether	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/1	0/1
		Diphenyl ether	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/1	0/1
		2,4-Dinitrotoluene	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/1	0/1
		2,6-Dinitrotoluene	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/1	0/1
		Bis(2-chloroethoxy)methane	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/1	0/1
		Diphenylamine	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/1	0/1
		N-Nitrosodiphenylamine	0/6	0/6	0/3	0/9	0/7	0/3	1/4	0/2	0/7	0/1	0/1
		N-Nitrosodi-n-propylamine	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/1	0/1
20	Extractables, Acid (Phenolics)	2,3,4,5-Tetrachlorophenol	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/1	0/1
		2,3,4,6-Tetrachlorophenol	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/1	0/1
		2,3,5,6-Tetrachlorophenol	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/1	0/1
		2,3,4-Trichlorophenol	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/1	0/1
		2,3,5-Trichlorophenol	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/1	0/1
		2,4,5-Trichlorophenol	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/1	0/1
		2,4,6-Trichlorophenol	0/6	0/6	0/3	0/9	0/7	0/3	0/4	1/14	0/7	0/1	0/1
		2,4-Dimethyl phenol	3/6	1/6	0/3	0/9	0/7	0/3	0/4	3/14	0/7	0/1	0/1
		2,4-Dinitrophenol	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/1	0/1
		2,4-Dichlorophenol	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/1	0/1
		2,6-Dichlorophenol	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/1	0/1
		4,6-Dinitro-o-cresol	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/1	0/1
		2-Chlorophenol	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/14	0/7	0/1	0/1
		4-Chloro-3-methylphenol	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/1	0/1

TABLE 2: IRON AND STEEL PRE-REGULATION MONITORING FREQUENCIES OF DETECTION

	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED	COKE MAKING	IRON MAKING	STEEL MAKING WET	HOT FORMING	COLD FORMING	LASCO	ATLAS	ALGOMA FINAL EFFLUENT	STELCO HILTON WORKS	STELCO LEW PROCESS	STELCO LEW FINAL
20	Extractables, Acid (Phenolics (continued)	4-Nitrophenol	0/6	0/6	0/3	0/9	0/7	0/3	0/4	0/2	0/7	0/1	0/1
		m-Cresol	0/6	1/6	0/3	0/9	1/7	0/3	0/4	0/14	0/7	0/1	0/1
		o-Cresol	2/6	1/6	1/3	0/9	0/7	0/3	0/4	0/2	0/7	0/1	0/1
		p-Cresol	2/6	1/6	1/3	0/9	1/7	0/3	0/4	0/14	0/7	0/1	0/1
		Pentachlorophenol	1/6	0/6	0/3	0/9	0/7	0/3	0/4	0/14	0/7	0/1	0/1
		Phenol	2/6	2/6	0/3	0/9	2/7	0/3	0/4	0/14	0/7	0/1	0/1
23	Extractables, Neutral -Chlorinated	1,2,3,4-Tetrachlorobenzene	0/6	0/6	0/3	0/9	2/7	0/2	0/4	0/2	2/7	0/2	0/2
		1,2,3,5-Tetrachlorobenzene	0/6	0/6	0/3	0/9	0/7	0/2	0/4	0/2	0/7	0/2	0/2
		1,2,4,5-Tetrachlorobenzene	0/6	0/6	0/3	1/9	0/7	0/2	0/4	0/2	2/7	0/2	0/2
		1,2,3-Trichlorobenzene	1/6	3/6	1/3	6/9	1/7	1/2	0/4	0/2	3/7	0/2	0/2
		1,2,4-Trichlorobenzene	2/6	3/6	2/3	5/9	6/7	2/2	0/4	2/14	6/7	0/2	1/2
		2,4,5-Trichlorotoluene	1/6	0/6	0/3	0/9	1/7	0/2	0/4	0/2	0/7	0/2	0/2
		Hexachlorobenzene	2/6	1/6	0/3	0/9	3/7	0/2	0/4	0/2	2/7	0/2	0/2
		Hexachlorobutadiene	2/6	1/6	1/3	4/9	2/7	1/2	1/4	0/2	1/7	0/2	0/2
		Hexachlorocyclopentadiene	0/6	0/6	0/3	3/9	1/7	0/2	0/4	0/2	0/7	1/2	1/2
		Hexachloroethane	0/6	0/6	1/3	3/9	0/7	0/2	1/4	1/2	0/7	2/2	1/2
		Octachlorostyrene	1/6	0/6	0/3	1/9	2/7	0/2	0/4	0/2	0/7	0/2	0/2
		Pentachlorobenzene	0/6	1/6	0/3	2/9	1/7	1/2	0/4	0/2	2/7	0/2	0/2
24	Chlorinated Dibenzo-p-dioxins and Dibenzofurans	2,3,7,8-Tetrachlorodibenzo-p-dioxin	0/1	0/2	0/1	0/1	0/1	0/2	0/1	NA	0/2	0/1	0/1
		Octachlorodibenzo-p-dioxin	0/1	0/2	0/1	0/1	0/1	0/2	0/1	NA	0/2	0/1	0/1
		Octachlorodibenzofuran	0/1	0/2	0/1	0/1	0/1	0/2	0/1	NA	0/2	0/1	0/1
		Total heptachlorinated dibenzo-p-dioxins	0/1	0/2	0/1	0/1	0/1	0/2	0/1	NA	0/2	0/1	0/1
		Total heptachlorinated dibenzofurans	0/1	0/2	0/1	0/1	0/1	0/2	0/1	NA	0/2	0/1	0/1
		Total hexachlorinated dibenzo-p-dioxins	0/1	0/2	0/1	0/1	0/1	0/2	0/1	NA	0/2	0/1	0/1
		Total hexachlorinated dibenzofurans	0/1	0/2	0/1	0/1	0/1	0/2	0/1	NA	0/2	0/1	0/1
		Total pentachlorinated dibenzo-p-dioxins	0/1	0/2	0/1	0/1	0/1	0/2	0/1	NA	0/2	0/1	0/1
		Total pentachlorinated dibenzofurans	0/1	0/2	0/1	0/1	0/1	0/2	0/1	NA	0/2	0/1	0/1
		Total tetrachlorinated dibenzo-p-dioxins	0/1	0/2	0/1	0/1	0/1	0/2	0/1	NA	0/2	0/1	0/1
		Total tetrachlorinated dibenzofurans	0/1	0/2	0/1	0/1	0/1	0/2	0/1	NA	0/2	0/1	0/1

TABLE 2: IRON AND STEEL PRE-REGULATION MONITORING FREQUENCIES OF DETECTION

	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED	COKE MAKING	IRON MAKING	STEEL MAKING WET	HOT FORMING	COLD FORMING	LASCO	ATLAS	ALGOMA FINAL EFFLUENT	STELCO HILTON WORKS	STELCO LEW PROCESS	STELCO LEW FINAL
26	Fatty and Resin Acids	Abietic acid	1/4	0/3	0/3	1/9	2/7	0/2	0/3	0/2	0/6	0/1	0/1
		Chlorodehydroabietic acid	0/4	0/3	0/3	NA	NA	0/2	0/3	0/2	0/6	0/1	0/1
		Dehydroabietic acid	0/4	0/3	0/3	0/9	2/7	0/2	0/3	0/2	0/6	0/1	0/1
		Isopimeric acid	1/4	0/3	0/3	0/9	3/7	0/2	0/3	0/2	0/6	0/1	0/1
		Levopimeric acid	0/4	0/3	0/3	0/9	1/7	0/2	0/3	0/2	0/6	0/1	0/1
		Neoabietic acid	0/4	0/3	0/3	0/9	0/7	0/2	0/3	0/2	0/6	0/1	0/1
		Oleic acid	1/4	2/3	0/3	7/9	5/7	0/2	0/3	0/2	0/6	0/1	0/1
		Pimaric acid	0/4	0/3	0/3	0/9	1/7	0/2	0/3	0/2	0/6	0/1	0/1
27	Polychlorinated Biphenyls (PCBs) (Total)	PCBs (Total)	0/4	1/3	0/3	2/9	0/9	0/2	2/4	0/14	3/6	0/1	0/1

TABLE 3: IRON AND STEEL PRE-REGULATION MONITORING - PARAMETERS THAT EXCEEDED MOE MDL

	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED	COKE MAKING	IRON MAKING	STEEL MAKING WET	HOT FORMING	COLD FORMING	LASCO	ATLAS	ALGOMA FINAL EFFLUENT	STELCO HILTON FINAL EFFLUENT	STELCO LEW PROCESS	STELCO LEW FINAL
9	Total metals	Aluminum	X	X	X	X		X	X	X	X	X	
		Beryllium											
		Cadmium	X										
		Chromium	X				X		X		X		
		Cobalt											
		Copper	X			X	X	X	X	X	X		
		Lead		X					X		X	X	
		Molybdenum		X	X	X		X	X		X	X	
		Nickel					X	X	X		X		
		Silver											
		Thallium											
		Vanadium											
		Zinc	X	X	X	X	X	X	X	X	X	X	
10	Hydrides	Antimony											
		Arsenic	X	X			X			X			
		Selenium	X							X			
12	Mercury	Mercury	X										
16	Volatiles, Halogenated	1,1,2,2-Tetrachloroethane											
		1,1,2-Trichloroethane											
		1,1-Dichloroethane					X						
		1,1-Dichloroethylene											
		1,2-Dichlorobenzene											
		1,2-Dichloroethane (Ethylene dichloride)											
		1,2-Dichloropropane											
		1,3-Dichlorobenzene											
		1,4-Dichlorobenzene											
		Bromoform				X					X	X	X
		Bromomethane									X	X	X
		Carbon tetrachloride											
		Chlorobenzene											
		Chloroform		X		X	X				X	X	X
		Chloromethane			X								
		Cis-1,3-Dichloropropylene											
		Dibromochloromethane									X	X	X

TABLE 3: IRON AND STEEL PRE-REGULATION MONITORING - PARAMETERS THAT EXCEEDED MOE MDL

	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED	COKE MAKING	IRON MAKING	STEEL MAKING WET	HOT FORMING	COLD FORMING	LASCO	ATLAS	ALGOMA FINAL EFFLUENT	STELCO HILTON FINAL EFFLUENT	STELCO LEW PROCESS	STELCO LEW FINAL
16	Volatiles, Halogenated (continued)	Ethylene dibromide											
		Methylene chloride	X	X	X	X					X	X	X
		Tetrachloroethylene (Perchloroethylene)											
		Trans-1,2-Dichloroethylene											
		Trans-1,3-Dichloropropylene											
		Trichloroethylene											
		Trichlorofluoromethane											
		Vinyl chloride (Chloroethylene)											
17	Volatiles, Non-Halogenated	Benzene	X							X	X	X	X
		Styrene	X	X						X	X		X
		Toluene	X	X						X			X
		o-Xylene	X							X			
		m-Xylene and p-Xylene	X							X			
18	Extractables, Base Neutral	Acenaphthene			X								
		5-nitro Acenaphthene			X								
		Acenaphthylene	X		X				X				
		Anthracene	X										
		Benz(a)anthracene	X		X	X			X				
		Benzo(a)pyrene	X		X								
		Benzo(b)fluoranthene	X		X				X				
		Benzo(g,h,I)perylene	X										
		Benzo(k)fluoranthene	X		X				X				
		Biphenyl											
		Camphene											
		1-Chloronaphthalene											
		2-Chloronaphthalene											
		Chrysene	X										
		Dibenz(a,h)anthracene	X										
		Fluoranthene	X		X	X			X		X		
		Fluorene	X		X								
		Indeno(1,2,3-cd)pyrene	X										
		Indole	X										
		1-Methylnaphthalene	X		X								
		2-Methylnaphthalene	X		X								
		Naphthalene	X								X		

TABLE 3: IRON AND STEEL PRE-REGULATION MONITORING - PARAMETERS THAT EXCEEDED MOE MDL

	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED	COKE MAKING	IRON MAKING	STEEL MAKING WET	HOT FORMING	COLD FORMING	LASCO	ATLAS	ALGOMA FINAL EFFLUENT	STELCO HILTON FINAL EFFLUENT	STELCO LEW PROCESS	STELCO LEW FINAL
19	Extractables, Base Neutral (continued)	Perylene	X										
		Phenanthrene			X	X			X				
		Pyrene			X	X			X				
		Benzyl butyl phthalate			X	X			X		X		X
		Bis(2-ethylhexyl) phthalate			X	X		X	X		X		X
		Di-n-butyl phthalate	X		X	X	X	X	X	X	X		X
		4-Bromophenyl phenyl ether											
		4-Chlorophenyl phenyl ether											
		Bis(2-chloroisopropyl)ether											
		Bis(2-chloroethyl)ether											
		Diphenyl ether											
		2,4-Dinitrotoluene											
		2,6-Dinitrotoluene											
		Bis(2-chloroethoxy)methane											
		Diphenylamine											
		N-Nitrosodiphenylamine											
		N-Nitrosodi-n-propylamine											
20	Extractables, Acid (Phenolics)	2,3,4,5-Tetrachlorophenol											
		2,3,4,6-Tetrachlorophenol											
		2,3,5,6-Tetrachlorophenol											
		2,3,4-Trichlorophenol											
		2,3,5-Trichlorophenol											
		2,4,5-Trichlorophenol											
		2,4,6-Trichlorophenol											
		2,4-Dimethyl phenol	X	X									
		2,4-Dinitrophenol											
		2,4-Dichlorophenol											
		2,6-Dichlorophenol											
		4,6-Dinitro-o-cresol											
		2-Chlorophenol											
		4-Chloro-3-methylphenol											
		4-Nitrophenol											

TABLE 3: IRON AND STEEL PRE-REGULATION MONITORING - PARAMETERS THAT EXCEEDED MOE MDL

	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED	COKE MAKING	IRON MAKING	STEEL MAKING WET	HOT FORMING	COLD FORMING	LASCO	ATLAS	ALGOMA FINAL EFFLUENT	STELCO HILTON FINAL EFFLUENT	STELCO LEW PROCESS	STELCO LEW FINAL
20	Extractables, Acid (Phenolics (continued)	m-Cresol											
		o-Cresol	X		X								
		p-Cresol	X	X	X								
		Pentachlorophenol											
		Phenol											
23	Extractables, Neutral -Chlorinated	1,2,3,4-Tetrachlorobenzene											
		1,2,3,5-Tetrachlorobenzene											
		1,2,4,5-Tetrachlorobenzene											
		1,2,3-Trichlorobenzene											
		1,2,4-Trichlorobenzene	X		X	X	X		X	X	X		
		2,4,5-Trichlorotoluene											
		Hexachlorobenzene											
		Hexachlorobutadiene				X							
		Hexachlorocyclopentadiene									X	X	
		Hexachloroethane									X	X	
		Octachlorostyrene											
		Pentachlorobenzene											

TABLE 4

SAMPLE SIZE REQUIREMENT
(Data From Algoma Steel MISA Pilot Site Study)

POLLUTANT	% DEVIATION 5	10	15	20	25
ammonia	231	58	20	14	9
cyanide	389	97	43	25	16
phenolics	549	136	60	34	22
oil and grease	1657	414	184	103	66
zinc	1137	273	124	68	49
iron	745	186	83	47	30

TABLE 5

PROBABILITY OF DETECTING AT LEAST ONE SAMPLE ABOVE THE DETECTION LIMIT

SINGLE SAMPLE PROBABILITY OF DETECT/NON-DETECT		TOTAL NUMBER OF SAMPLES					
p	q	12	10	8	6	4	2
0.5	0.5	.999	.999	.996	.984	.937	.750
0.4	0.6	.998	.994	.983	.953	.870	.640
0.3	0.7	.986	.972	.942	.882	.759	.510
0.2	0.8	.931	.893	.832	.738	.590	.360
0.1	0.9	.717	.651	.569	.468	.344	.190
0.01	0.99	.113	.095	.077	.058	.039	.019

TABLE 6

RAINBOW TROUT TEST - PROBABILITY OF DETECTING A TOXIC EFFLUENT

N	P50KILL	P51KILL	P75KILL	P95KILL	P99KILL
1	0.5000	0.5100	0.7500	0.9500	0.9900
2	0.7500	0.7599	0.9375	0.9975	0.9999
3	0.8750	0.8824	0.9844	0.9999	1.0000
4	0.9375	0.9424	0.9961	1.0000	1.0000
5	0.9688	0.9718	0.9990	1.0000	1.0000
6	0.9844	0.9862	0.9998	1.0000	1.0000
7	0.9922	0.9932	0.9999	1.0000	1.0000
8	0.9961	0.9967	1.0000	1.0000	1.0000
9	0.9980	0.9984	1.0000	1.0000	1.0000
10	0.9990	0.9992	1.0000	1.0000	1.0000
11	0.9995	0.9996	1.0000	1.0000	1.0000
12	0.9998	0.9998	1.0000	1.0000	1.0000

N = the number of tests

P50KILL = toxic effluent if at least 50% of the fish die
P51KILL = toxic effluent if at least 51% of the fish die
P75KILL = toxic effluent if at least 75% of the fish die
P95KILL = toxic effluent if at least 95% of the fish die
P99KILL = toxic effluent if at least 99% of the fish die

TABLE 7
SUMMARY OF FREQUENCY/PARAMETER ASSIGNMENT RULES

I PROCESS SUBCATEGORY EFFLUENT STREAMS

All Sites	Thrice Weekly:	Suspended Solids;
Process Specific	Thrice Weekly:	Candidate Compounds for Control allocated to specific process subcategory effluent stream;
		Total phosphorus for biological effluents;
	Monthly:	Analytical test groups that correspond to organic priority pollutant candidate compounds for control;

II FINAL EFFLUENT STREAMS

All Sites	Daily:	pH, suspended solids, specific conductance, and oil and grease;
	Weekly:	Parameters monitored under IMIS and total phosphorus;
Site Specific	Thrice Weekly:	Some or all of the Candidate Compounds for Control if the final effluent stream does not receive monitored process subcategory effluent streams;
		Dissolved organic carbon for final effluent streams that are likely to contain soluble organic compounds;
	Weekly:	Dissolved organic carbon for final effluent streams that are not likely to contain soluble organic compounds;
	Monthly:	Whole analytical test group if one member of the group is above the Ministry of the Environment Method Detection limit in either the final effluent stream or any of the process subcategory effluent streams that contribute to that final effluent;

TABLE 8

ESTIMATES OF THE INCREMENTAL COSTS BY PLANT FOR THE IRON AND STEEL SECTOR

	(1988 $ million) Capital	Operating*	TOTAL
Algoma Steel (Sault Ste. Marie)	1.4	.68	2.03
Atlas Specialty Steel (Welland)	.09	.20	.29
Dofasco (Hamilton)	2.0	.85	2.83
IVACO Rolling Mills (L'Original)	.004	.02	.03
LASCO (Whitby)	.21	.13	.34
Stelco Hilton Works (Hamilton)	1.2	.70	1.85
Stelco Lake Erie (Nanticoke)	.20	.36	.52
	4.9	2.9	7.89

Totals may not add up due to rounding

* Based on average lab prices

TABLE 9

IMPACT OF MONITORING COSTS ON SELECTED FINANCIAL INDICATORS (1981-1987)

PLANT	CAPITAL EXPENDITURES			AFTER-TAX EARNINGS		
	Monitoring Capital Cost as a % of Annual Average Capital Expenditure			Monitoring Operating Cost as a % of Annual Average After-Tax Earnings (Loss)		
	Highest Year	Lowest Year	Average Over 1981-87	Highest Year	Lowest Year	Average Over 1981-87
ALGOMA CORP.	.5	5.5	1.0	.4	(.21)	1.0
RIO ALGOM (ATLAS SPECIALTY STEELS)	.05	.08	.07	.2	1.1	.3
DOFASCO	.4	3.5	.7	.5	1.6	.7
IVACO INC. (IVACO Rolling Mills)	.00	.01	.01	.06	(.3)	.1
CO-STEEL INC. (LASCO)	.5	3.8	1.0	.3	(.4)	3.0
STELCO INC.	.4	3.1	.5.	1.3	(2.6)	.1
SECTOR	.4	1.8	.6	.6	(-6.0)	1.3

Source: Economic Implications of the MISA Monitoring Regulation on Ontario's Iron and Steel Sector, January 1988.

APPENDIX II

MONITORING SCHEDULE 1: ALGOMA STEEL

CORPORATE NAME: Algoma Steel

SAMPLING POINT	SAMPLING FREQUENCY							EFFLUENT CLASSIFICATION
	DAILY	THRICE WEEKLY	WEEKLY	MONTHLY	QUARTERLY	TWICE PER YEAR	EVENT ORIENTATED	
By-Products Area		Ammonia Benzene Benzo(a)pyrene Cyanide Naphthalene Oil and Grease Phenolics (4AAP) Suspended Solids		Analytical Test Groups 17, 19 Quality Control Samples for thrice weekly's				PROCESS Subcategory COKEMAKING
#2 Thickener		Ammonia Cyanide Phenolics (4AAP) Suspended Solids Zinc						PROCESS Subcategory IRONMAKING
#1 Thickener		Ammonia Chromium Cyanide Lead Oil and Grease Phenolics (4AAP) pH Suspended Solids Zinc						PROCESS Subcategory SINTERING STEELMAKING (wet process) ACID PICKLING COLD FORMING
Tube Mill		Lead Oil and Grease pH Suspended Solids Zinc						PROCESS Subcategory HOT FORMING
Terminal Settling Basins	Conductivity Oil and Grease pH Suspended Solids	Dissolved organic carbon	Ammonia Cyanide Iron Phenolics (4AAP) Total Phosphorus Sulphides	Fish Toxicity Test Daphnia Magna Acute Lethality Toxicity Test Analytical Test Groups 9, 10, 12, 16, 17, 19, 20, 23 Quality Control Samples for daily's, thrice weekly's and weekly's	Analytical Test Groups 4b, 5b, 11, 26 Open Characterization 28a, 28b, 29	Analytical Test Groups 24, 27 Quality Control Samples for monthly's		FINAL EFFLUENT COKEMAKING COLD FORMING

MONITORING SCHEDULE 1: ALGOMA STEEL (continued)

CORPORATE NAME: Algoma Steel

SAMPLING POINT	SAMPLING FREQUENCY							EFFLUENT CLASSIFICATION
	DAILY	TWICE WEEKLY	WEEKLY	MONTHLY	QUARTERLY	TWICE PER YEAR	EVENT ORIENTATED	
Bar and Strip Lagoon Outfall	Conductivity Oil and Grease pH Suspended Solids	Dissolved organic carbon	Ammonia Cyanide Iron Phenolics (4AAP) Total Phosphorus Zinc	Fish Toxicity Test Daphnia Magna Acute Lethality Toxicity Test Analytical Test Groups 9, 10, 16, 17, 19, 20, 23	Analytical Test Groups 11, 15, 12, 26 Open Characterization 26a, 26b, 29	Analytical Test Groups 24, 27		FINAL EFFLUENT IRON MAKING STEELMAKING
Cold Mill 84"	pH		Suspended Solids	Ammonia Cyanide Dissolved organic carbon Iron Lead Oil and Grease Phenolics (4AAP) Total Phosphorus Zinc	Analytical Test Groups 4b, 5b, 9, 10, 11, 12, 15, 16, 17, 19, 20, 23, 26 Fish Toxicity Test Daphnia Magna Acute Lethality Toxicity Test			COOLING WATER
Cold Mill 80"	pH			Ammonia Cyanide Dissolved organic carbon Iron Lead Oil and Grease Phenolics (4AAP) Total Phosphorus Suspended Solids Zinc	Analytical Test Groups 4b, 5b, 9, 10, 11, 12, 15, 16, 17, 19, 20, 23, 26 Fish Toxicity Test Daphnia Magna Acute Lethality Toxicity Test			COOLING WATER
66" Sewer Outfall	pH			Ammonia Cyanide Dissolved organic carbon Iron Lead Oil and Grease Phenolics (4AAP) Total Phosphorus Suspended Solids Zinc	Analytical Test Groups 4b, 5b, 9, 10, 11, 12, 15, 16, 17, 19, 20, 23, 26 Fish Toxicity Test Daphnia Magna Acute Lethality Toxicity Test			COOLING WATER

MONITORING SCHEDULE 1: ALGOMA STEEL (continued)

CORPORATE NAME: Algoma Steel

SAMPLING POINT	SAMPLING FREQUENCY							EFFLUENT CLASSIFICATION
	DAILY	THRICE WEEKLY	WEEKLY	MONTHLY	QUARTERLY	TWICE PER YEAR	EVENT ORIENTATED	
30" Sewer Outfall	pH			Ammonia Cyanide Dissolved organic carbon Iron Lead Oil and Grease Phenolics (4AAP) Total Phosphorus Suspended Solids Zinc	Analytical Test Groups 4b, 5b, 9, 10, 11, 12, 15, 16, 17, 19, 20, 23, 26 Fish Toxicity Test Daphnia Magna Acute Lethality Toxicity Test	Quality Control Samples for monthly's		COOLING WATER
Cold Mill Storm Sewer Outfall				Ammonia Benzene Benzo(a)Pyrene Chromium Cyanide Lead Naphthalene Oil and Grease Phenolics (4AAP) Suspended Solids Zinc				STORM WATER

MONITORING SCHEDULE 2: ATLAS SPECIALTY STEEL

CORPORATE NAME: Atlas Steel

SAMPLING POINT	SAMPLING FREQUENCY							EFFLUENT CLASSIFICATION
	DAILY	THRICE WEEKLY	WEEKLY	MONTHLY	QUARTERLY	TWICE PER YEAR	EVENT ORIENTATED	
Waste Acid Solidification Plant			Oil and Grease pH Suspended Solids Analytical Test Groups 9, 10, 11					PROCESS Subcategory ACID PICKLING
North Plant Treatment		Chromium Hexavalent Chromium Nickel Oil and Grease pH Suspended Solids Zinc		Quality Control Samples for thrice weekly's				PROCESS Subcategory HOT FORMING STEELMAKING (wet process) ACID PICKLING
Others		Chromium Nickel Oil and Grease pH Suspended Solids Zinc						Recycled PROCESS Water for Cooling
42" Sewer	Conductivity Oil and Grease pH Suspended Solids	Dissolved organic carbon	Total Phosphorus	Iron Analytical Test Groups 9, 16, 19, 23 Fish Toxicity Test Daphnia Magna Acute Lethality Toxicity Test Quality Control Samples for daily's, thrice weekly's and weekly's	Analytical Test Groups 4, 6b, 10, 11, 17, 20 Open Characterization 26a, 26b, 29	Analytical Test Groups 24, 27 Quality Control Samples for monthly's		FINAL EFFLUENT HOT FORMING STEELMAKING ACID PICKLING
Waste Disposal Site							Hexavalent Chromium Nickel Oil and Grease Suspended Solids Zinc	WASTE DISPOSAL SITE EFFLUENT
South Plant Water Reclaim							Nickel Oil and Grease Suspended Solids Zinc	EMERGENCY OVERFLOW

MONITORING SCHEDULE 2: ATLAS SPECIALTY STEEL

CORPORATE NAME: Atlas Steel

SAMPLING POINT	SAMPLING FREQUENCY							EFFLUENT CLASSIFICATION
	DAILY	TWICE WEEKLY	WEEKLY	MONTHLY	QUARTERLY	TWICE PER YEAR	EVENT ORIENTATED	
North Plant Water Reclaim at 42" Sewer							Nickel Oil and Grease Suspended Solids Zinc	EMERGENCY OVERFLOW
R & D				Nickel Oil and Grease Suspended Solids Zinc				STORM WATER

MONITORING SCHEDULE 3: DOFASCO

CORPORATE NAME: Dofasco

SAMPLING POINT	SAMPLING FREQUENCY							EFFLUENT CLASSIFICATION
	DAILY	THRICE WEEKLY	WEEKLY	MONTHLY	QUARTERLY	TWICE PER YEAR	EVENT ORIENTATED	
Coke Plant Biological Plant Discharge		Ammonia Benzene Benzo(a)Pyrene Cyanide Naphthalene Oil and Grease Phenolics (4AAP) Suspended Solids	Total Phosphorus	Analytical Test Groups 17, 19 Quality Control Samples for thrice weekly's and weekly's				PROCESS Subcategory COKEMAKING
Blast Furnace Recycle Blowdown		Ammonia Cyanide Phenolics (4AAP) Suspended Solids Zinc						PROCESS Subcategory IRONMAKING
Steelmaking Clarifier Discharge		Lead Oil and Grease Suspended Solids Zinc						PROCESS Subcategory STEELMAKING (wet process)
#1 Hot Mill Filtration Plant Discharge		Lead Oil and Grease pH Suspended Solids Zinc						PROCESS Subcategory HOT FORMING
Cold Mill Treatment Plant Discharge		Chromium Dissolved organic carbon Lead Oil and Grease pH Suspended Solids Zinc						PROCESS Subcategory COLD FORMING
Ottawa Sewer	Conductivity Oil and Grease pH Suspended Solids	Dissolved organic carbon	Ammonia Chromium Cyanide Iron Phenolics (4AAP) Total Phosphorus	Fish Toxicity Test Daphnia Magna Acute Lethality Toxicity Test Analytical Test Groups 9, 16, 18, 23	Analytical Test Groups 4b, 5b, 10, 11, 12, 16, 17, 30, 26 Open Characterization 28a, 28b, 29	Analytical Test Groups 24, 27		FINAL EFFLUENT HOT FORMING

MONITORING SCHEDULE 3: DOFASCO (continued)

CORPORATE NAME: Dofasco

SAMPLING POINT	SAMPLING FREQUENCY							EFFLUENT CLASSIFICATION
	DAILY	THRICE WEEKLY	WEEKLY	MONTHLY	QUARTERLY	TWICE PER YEAR	EVENT ORIENTATED	
West Bayfront Sewer	Conductivity Oil and Grease pH Suspended Solids	Dissolved organic carbon	Ammonia Chromium Cyanide Iron Phenolics (4AAP) Total Phosphorus Zinc	Fish Toxicity Test Daphnia Magna Acute Lethality Toxicity Test Analytical Test Groups 9, 10, 12, 16, 17, 19, 20, 23 Quality Control Samples for daily's, thrice weekly's and weekly's	Analytical Test Groups 4b, 5b, 11, 15, 26 Open Characterization 26a, 26b, 26	Analytical Test Groups 24, 27 Quality Control Samples for monthly's		FINAL EFFLUENT COKEMAKING IRONMAKING STEELMAKING (wet process)
East Bost Slip Sewer	Conductivity Oil and Grease pH Suspended Solids	Dissolved organic carbon	Ammonia Chromium Cyanide Iron Phenolics (4AAP) Total Phosphorus Zinc	Fish Toxicity Test Daphnia Magna Acute Lethality Toxicity Test Analytical Test Groups 9, 10, 12, 16, 17, 19, 20, 23 Quality Control Samples for daily's, thrice weekly's and weekly's	Analytical Test Groups 4b, 5b, 11, 15, 26 Open Characterization 26a, 26b, 26	Analytical Test Groups 24, 27 Quality Control Samples for monthly's		FINAL EFFLUENT COKEMAKING STEELMAKING (wet process)
Boilerhouse Sewer #1			Ammonia Cyanide Chromium Iron Phenolics (4AAP) Total Phosphorus Zinc	Dissolved organic carbon Lead Oil and Grease Suspended Solids	Analytical Test Groups 4b, 5b, 9, 10, 11, 12, 15, 16, 17, 19, 20, 23, 26 Fish Toxicity Test Daphnia Magna Acute Lethality Toxicity Test	Quality Control Samples for monthly's		COOLING WATER
Boilerhouse Sewer #2				Ammonia Cyanide Dissolved organic carbon Iron Lead Oil and Grease Phenolics (4AAP) Suspended Solids Total Phosphorus Zinc	Analytical Test Groups 4b, 5b, 9, 10, 11, 12, 15, 16, 17, 19, 23, 23, 26 Fish Toxicity Test Daphnia Magna Acute Lethality Toxicity Test			COOLING WATER

MONITORING SCHEDULE 3: DOFASCO (continued)

CORPORATE NAME: Dofasco

SAMPLING POINT	SAMPLING FREQUENCY							EFFLUENT CLASSIFICATION
	DAILY	THRICE WEEKLY	WEEKLY	MONTHLY	QUARTERLY	TWICE PER YEAR	EVENT ORIENTATED	
Southeast Coal Fields Storm Sewer							Ammonia Benzene Benzo(a)Pyrene Chromium Cyanide Lead Naphthalene Oil and Grease Phenolics (4AAP) Suspended Solids Zinc	STORAGE SITE EFFLUENT
Kenilworth Plant Storm Sewer				Ammonia Benzene Benzo(a)Pyrene Chromium Cyanide Lead Naphthalene Oil and Grease Phenolics (4AAP) Suspended Solids Zinc				STORM WATER

MONITORING SCHEDULE 4: IVACO ROLLING MILLS

CORPORATE NAME: Ivaco Inc.

SAMPLING POINT	SAMPLING FREQUENCY							EFFLUENT CLASSIFICATION
	DAILY	THRICE WEEKLY	WEEKLY	MONTHLY	QUARTERLY	TWICE PER YEAR	EVENT ORIENTATED	
East Discharge				Dissolved organic carbon Iron Lead Oil and Grease Suspended Solids Total Phosphorus Zinc	Analytical Test Groups 4, 5b, 9, 10, 11, 16, 17, 19, 20, 23, 26 Fish Toxicity Test Daphnia Magna Acute Lethality Toxicity Test	Quality Control Samples for monthly's		COOLING WATER
North-East Discharge				Lead Oil and Grease Suspended Solids Zinc				STORM WATER
Mill Pond Outlet							Lead Oil and Grease pH Suspended Solids Zinc Quality Control Samples	PROCESS subcategory HOT FORMING
East Discharge							Conductivity Lead Oil and Grease pH Suspended Solids Zinc Analytical Test Groups 24, 27 Open Characterization 28a, 28b, 29 Fish Toxicity Test Daphnia Magna Acute Lethality Toxicity Test Quality Control Samples	FINAL EFFLUENT HOT FORMING

MONITORING SCHEDULE 6: LAKE ONTARIO STEEL DIVISION OF CO - STEEL INC.

CORPORATE NAME: Lasco

SAMPLING POINT	SAMPLING FREQUENCY							EFFLUENT CLASSIFICATION
	DAILY	THRICE WEEKLY	WEEKLY	MONTHLY	QUARTERLY	TWICE PER YEAR	EVENT ORIENTATED	
South Pond	Conductivity Oil and Grease pH Suspended Solids	Lead Zinc	Dissolved organic carbon Iron Total Phosphorus	Analytical Test Groups 9, 16, 19, 23 Fish Toxicity Test Daphnia Magna Acute Lethality Toxicity Test Quality Control Samples for daily's, thrice weekly's and weekly's	Analytical Test Groups 4, 5b, 10, 11, 17, 20, 28 Open Characterization 26a, 26b, 29	Analytical Test Groups 24, 27 Quality Control Samples for monthly's		FINAL EFFLUENT HOT FORMING
Storm Water Discharge Point				Lead Oil and Grease Suspended Solids Zinc				STORM WATER
Waste Disposal Site							Lead Oil and Grease Suspended Solids Zinc	WASTE DISPOSAL SITE EFFLUENT

MONITORING SCHEDULE 6: STELCO HILTON

CORPORATE NAME: Stelco Hilton

SAMPLING POINT	SAMPLING FREQUENCY							EFFLUENT CLASSIFICATION
	DAILY	THRICE WEEKLY	WEEKLY	MONTHLY	QUARTERLY	TWICE PER YEAR	EVENT ORIENTATED	
62 Rod Mill	Conductivity Oil and Grease pH Suspended Solids	Lead Zinc	Dissolved organic carbon Iron Phenolics (4AAP) Total Phosphorus	Analytical Test Groups 2, 4a, 9, 16, 19, 23 Fish Toxicity Test Daphnia Magna Acute Lethality Toxicity Test	Analytical Test Groups 4b, 5b, 10, 11, 15, 17, 20 Open Characterization 26a, 26b, 29	Analytical Test Groups 24, 27		FINAL EFFLUENT HOT FORMING
20" Mill	Conductivity Oil and Grease pH Suspended Solids	Lead Zinc	Dissolved organic carbon Iron Phenolics (4AAP) Total Phosphorus	Analytical Test Groups 9, 16, 19, 23 Fish Toxicity Test Daphnia Magna Acute Lethality Toxicity Test	Analytical Test Groups 2, 4, 5b, 10, 11, 15, 17, 20 Open Characterization 26a, 26b, 29	Analytical Test Groups 24, 27		FINAL EFFLUENT HOT FORMING
#1 66" Sewer		Lead Oil and Grease pH Suspended Solids Zinc		Quality Control Samples for thrice weekly's				PROCESS subcategory ACID PICKLING
East Side Filter Plant	Conductivity Oil and Grease pH Suspended Solids	Ammonia Benzene Benzo(a)Pyrene Chromium Cyanide Dissolved organic carbon Lead Naphthalene Phenolics (4AAP) Zinc	Iron Total Phosphorus	Analytical Test Groups 9, 10, 12, 16, 17, 19, 20, 23 Fish Toxicity Test Daphnia Magna Acute Lethality Toxicity Test Quality Control Samples for daily's, thrice weekly's and weekly's	Analytical Test Groups 4b, 5b, 11, 15, 26 Open Characterization 26a, 26b, 29	Analytical Test Groups 24, 27 Quality Control Samples for monthly's		FINAL EFFLUENT COKEMAKING SINTERING HOT FORMING COLD FORMING STEELMAKING (wet process)
North Outlet	Conductivity Oil and Grease pH Suspended Solids	Dissolved organic carbon Lead Zinc	Ammonia Cyanide Iron Phenolics (4AAP) Total Phosphorus	Analytical Test Groups 9, 16, 19, 23 Fish Toxicity Test Daphnia Magna Acute Lethality Toxicity Test	Analytical Test Groups 4b, 5b, 10, 11, 12, 15, 17, 20, 29 Open Characterization 26a, 26b, 29	Analytical Test Groups 24, 27		FINAL EFFLUENT HOT FORMING

MONITORING SCHEDULE 6: STELCO HILTON (continued)

CORPORATE NAME: Stelco Hilton

SAMPLING POINT	SAMPLING FREQUENCY							EFFLUENT CLASSIFICATION
	DAILY	THRICE WEEKLY	WEEKLY	MONTHLY	QUARTERLY	TWICE PER YEAR	EVENT ORIENTATED	
West-Side Open Cut			Ammonia Cyanide Iron Oil and Grease Phenolics (4AAP) Suspended Solids Zinc	Dissolved organic carbon Lead Total Phosphorus	Analytical Test Groups 4b, 5b, 9, 10, 11, 12, 15, 16, 17, 19, 20, 23, 26 Fish Toxicity Test Daphnia Magna Acute Lethality Toxicity Test	Quality Control Samples for monthly's		COOLING WATER
North-West Outfall			Ammonia Cyanide Iron Oil and Grease Phenolics (4AAP) Suspended Solids Zinc	Dissolved organic carbon Lead Total Phosphorus	Analytical Test Groups 4b, 5b, 9, 10, 11, 12, 15, 16, 17, 19, 20, 23, 26 Fish Toxicity Test Daphnia Magna Acute Lethality Toxicity Test			COOLING WATER
6' 2 60" Sewer				Ammonia Benzene Benzo(a)Pyrene Chromium Cyanide Lead Naphthalene Oil and Grease Phenolics (4AAP) Suspended Solids Zinc				STORM WATER
East Side Filter Plant Overflow Weir							Ammonia Benzene Benzo(a)Pyrene Chromium Cyanide Lead Naphthalene Oil and Grease Phenolics (4AAP) Suspended Solids Zinc	EMERGENCY OVERFLOW

MONITORING SCHEDULE 7: STELCO LAKE ERIE WORKS

CORPORATE NAME: Stelco Lake Erie Works

SAMPLING POINT	SAMPLING FREQUENCY							EFFLUENT CLASSIFICATION
	DAILY	THRICE WEEKLY	WEEKLY	MONTHLY	QUARTERLY	TWICE PER YEAR	EVENT ORIENTATED	
Blowdown Treatment Plant		Ammonia Benzene Benzo(a)Pyrene Chromium Cyanide Lead Naphthalene Oil and Grease pH Phenolics (4AAP) Suspended Solids Zinc		Analytical Test Groups 17, 18 Quality Control Samples for thrice weekly's and weekly's				PROCESS Subcategory COKEMAKING IRONMAKING STEELMAKING (wet process) HOT FORMING
64 Pond Discharge	Conductivity Oil and Grease pH Suspended Solids	Dissolved organic carbon	Ammonia Cyanide Phenolics (4AAP) Total Phosphorus	Fish Toxicity Test Daphnia Magna Acute Lethality Toxicity Test Analytical Test Groups 9, 10, 12, 16, 17, 19, 20, 23 Quality Control Samples for daily's, thrice weekly's and weekly's	Analytical Test Groups 4b, 8b, 11, 15, 26 Open Characterization 26a, 26b, 26	Analytical Test Groups 24, 27 Quality Control Samples for monthly's		FINAL EFFLUENT COKEMAKING IRONMAKING STEELMAKING (wet process) HOT FORMING
Steam Water Pond #2				Ammonia Benzene Benzo(a)Pyrene Chromium Cyanide Lead Naphthalene Oil and Grease Phenolics (4AAP) Suspended Solids Zinc				STORM WATER
Lagoon E							Ammonia Benzene Benzo(a)Pyrene Chromium Cyanide Lead Naphthalene Oil and Grease pH Phenolics (4AAP) Sulphide Suspended Solids Zinc	WASTE DISPOSAL SITE EFFLUENT

MONITORING SCHEDULE 7: STELCO LAKE ERIE WORKS (continued)

CORPORATE NAME: Stelco Lake Erie Works

SAMPLING POINT	SAMPLING FREQUENCY							EFFLUENT CLASSIFICATION
	DAILY	THRICE WEEKLY	WEEKLY	MONTHLY	QUARTERLY	TWICE PER YEAR	EVENT ORIENTATED	
Coal Storage Area							Ammonia Benzene Benzo(a)Pyrene Chromium Cyanide Lead Naphthalene Oil and Grease Phenolics (4AAP) Suspended Solids Zinc	STORAGE SITE EFFLUENT

PART III

THE DRAFT EFFLUENT MONITORING REGULATION FOR THE IRON AND STEEL SECTOR

DRAFT REGULATION MADE UNDER THE ENVIRONMENTAL PROTECTION ACT

EFFLUENT MONITORING - IRON AND STEEL SECTOR

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ONTARIO REGULATION XXX/XX

under the Environmental Protection Act

EFFLUENT MONITORING - IRON AND STEEL SECTOR

January 17, 1989

ONTARIO REGULATION XXX/XX

under the Environmental Protection Act

EFFLUENT MONITORING - IRON AND STEEL SECTOR

DEFINITIONS

1.-(1) In this Regulation;

"acid pickling" means the process of chemically removing oxides and scale from the surface of steel by the action of water solutions and inorganic acids;

"characterization" means the analysis of a sample to identify and quantify all of the parameters in Schedule A or Schedule B;

"cold forming" means the steel forming process in which cold steel is transformed in size and shape through a series of forming steps;

"cokemaking" means the production of coke from coal in by-product coking ovens;

"cooling water" means water and associated material that is used in an industrial process for the purpose of removing heat and that is not intended to come into contact with process materials, and that is discharged to a surface watercourse;

"cooling water effluent stream" means cooling water which flows through an open or closed channel;

"cooling water sampling point" means a location in a cooling water effluent stream situated before the place of discharge to a surface watercourse;

"emergency overflow" means a diversion of effluent that by-passes a final effluent sampling point;

"final effluent" means any effluent which contains process subcategory effluent and which may contain one or more of cooling water, storm water and waste disposal site effluent;

"final effluent sampling point" means a location in a final effluent stream situated before the place of discharge to a surface watercourse;

"final effluent stream" means a final effluent which flows through an open or closed channel;

"final treatment" means the last treatment before a final effluent is discharged to a surface watercourse;

"General Effluent Monitoring Regulation" means Ontario Regulation XXX/88;

"hot forming" means the steel forming process in which hot steel is transformed in size and shape through a series of forming steps to produce semi-finished and finished steel products;

"ironmaking" means the production of molten iron by the reduction of iron ore, sinter and steel slag;

"open characterization" means the analysis of a sample,

(a) to identify and quantify the parameters in analytical test groups 16, 17, 19, 20 and 23 at the analytical method detection limits specified in Schedule 3 of the General Effluent Monitoring Regulation, and

(b) to identify and to determine the approximate quantity of a parameter in analytical test groups 28 and 29 in Schedule C of this Regulation;

"process change" means a change in equipment, production process or treatment process;

"process subcategory" means cokemaking, sintering, ironmaking, steelmaking, cold forming, hot forming, salt bath descaling and acid pickling processes;

"process subcategory effluent" means any effluent from a process subcategory that is contaminated or potentially contaminated through contact by design with that process subcategory;

"process subcategory effluent sampling point" means a location in a process subcategory effluent stream situated,

(a) upstream of any significant contaminant masking or significant dilution by any other effluent, and

(b) after treatment and before final treatment if treatment exists;

"process subcategory effluent stream" means a process subcategory effluent which flows through an open or closed channel;

"salt bath descaling" means the operation in which specialty steel products are processed in molten salt solutions in order to remove scale;

"semi-annually" means a period of six months beginning on the first day of January or July;

"sintering" means the production of an agglomerate which is one of the feed materials in the iron and steel making processes;

"steelmaking wet process" means the production of steel in basic oxygen or electric arc furnaces using wet gas cleaning methods;

"storage site" means an on-site or off-site area of land owned or operated by the direct discharger and established or operated to store coal or coke;

"storage site effluent" means any liquid from a storage site that is collected for discharge to a surface watercourse;

"storage site effluent sampling point" means a location in a storage site effluent stream situated,

(a) before any place of discharge to a surface watercourse,

(b) upstream of significant dilution by other effluent, and

(c) after final treatment if final treatment exists;

"storage site effluent stream" means storage site effluent which flows through an open or closed channel;

"treatment" means the use of physical, chemical or biological processes or any combination thereof, to condition an effluent;

"waste disposal site effluent" means any liquid from a waste disposal site which has been in contact with the waste and which is collected for discharge to a surface watercourse;

(2) The definitions in section 1 of the General Effluent Monitoring Regulation that are not redefined in this Regulation apply to this Regulation.

PURPOSE

2. The purpose of this Regulation is to establish a data base on effluent quality in the iron and steel sector that will be used, along with other pertinent information, to develop effluent limits for the iron and steel sector;

APPLICATION

3.-(1) This Regulation applies only with respect to the plants listed in subsection (2).

(2) The respective site-specific monitoring schedule for each plant in the iron and steel sector at the plant location named is as follows:

Schedule	Plant	Location	Owner as of the 1st of May,1988
1	Algoma Steel	Sault Ste. Marie	Canadian Pacific
2	Atlas Specialty Steel	City of Welland	Rio Algom Limited
3	Dofasco	City of Hamilton	Dofasco Inc.
4	Ivaco Rolling Mills	L'Orignal	Ivaco Inc.
5	Lasco	Town of Whitby	Co-Steel Inc.
6	Stelco Steel Hilton Works	City of Hamilton	Stelco Inc.
7	Stelco Steel Lake Erie Works	City of Nanticoke	Stelco Inc.

(3) This Regulation is a Sectoral Effluent Monitoring Regulation within the meaning of the General Effluent Monitoring Regulation.

(4) Each direct discharger shall carry out the monitoring obligations, including the sampling, analysis, toxicity testing, flow measurement, recording and reporting obligations of this Regulation, in accordance with the General Effluent Monitoring Regulation and in accordance with the analytical principles listed in Schedules D and E of this Regulation.

(5) An obligation on a direct discharger to do a thing under this Regulation is discharged if another person has done it on the direct discharger's behalf.

(6) Each direct discharger shall notify the Director in writing of any change of name or ownership of its plant within thirty days after the day this Regulation comes into force or within thirty days after any such change.

(7) In the event that there is a change in the classification of an effluent, the redirection of an effluent or a process change, the direct discharger shall notify the Director in writing.

(8) The sampling and flow measurement obligations for final effluent as defined in this Regulation shall be carried out in accordance with the sampling and flow measurement obligations for combined effluent as specified in the General Effluent Monitoring Regulation.

(9) Where a sample is collected from a process subcategory effluent sampling point or a final effluent sampling point for analysis for parameters in analytical test groups 15 to 17 and 28a, the sample shall consist of a single grab sample.

(10) In the event that a direct discharger cannot collect a sufficient volume of sample from a sampling point to perform all of the analyses required for that sampling point because of the collection of inspection samples or because of a lack of flow, the direct discharger shall collect a set of samples from that sampling point on the following day or when the flow resumes and shall perform all of the analyses required for that sampling point.

SAMPLING POINTS

4.-(1) Each direct discharger shall establish a sampling point on each effluent stream specified in the respective site-specific monitoring schedule.

(2) Each direct discharger shall use the sampling points established under subsection (1) for all sampling required by this Regulation, except that a direct discharger may use alternate sampling points where that is acceptable to the Director.

(3) In the event that a direct discharger establishes an additional sampling point to be considered under this Regulation, the direct discharger shall,

(a) notify the Director, 30 days prior to the establishment of that sampling point, in writing of the location of that sampling point, the classification of that effluent, the frequency of sampling, the duration of sampling, those parameters and analytical test groups to be analyzed for and those characterizations to be performed if any;

(b) collect a set of samples from that sampling point sufficient to perform all of the analyses proposed for that sampling point;

(c) analyze each set of samples collected from that sampling point for the parameters, analytical test groups and characterizations, if any, proposed for that sampling point;

(d) follow the sampling and analytical requirements specified in section 3 and section 4 of the General Effluent Monitoring Regulation and subsection 3(9) of this Regulation; and

(e) meet the quality control, flow measurement and reporting requirements as specified in sections 17, 19 and 20 of this Regulation;

CHARACTERIZATION AND OPEN CHARACTERIZATION

5.-(1) Each direct discharger shall collect a set of samples sufficient to perform the characterization analyses required by subsections (2) and (3) from each final effluent sampling point of that discharger,

(a) during the months of January, April, July and October for all analytical test groups, except 24 and 27 listed in the respective Schedule A or Schedule B for that direct discharger;

(b) semi-annually for analytical test groups 24 and 27 with the second collection of samples not sooner than four months but not later than seven months after the collection of the first set of samples; and

(c) once within thirty days after every process change that may adversely affect the quality of that final effluent.

(2) Each direct discharger shall perform characterization analyses on each set of samples collected under clause (1)(a) for the parameters in each analytical test group listed in the respective Schedule A or Schedule B for that discharger except for analytical test groups 24 and 27.

(3) Each direct discharger shall perform characterization analyses on each set of samples collected under clause (1)(b) for the parameters in analytical test groups 24 and 27 listed in the respective Schedule A or Schedule B for that discharger.

(4) Each direct discharger shall collect a set of samples during the months of February, May, August and November sufficient to perform the open characterization analyses required by subsection (6) from each final effluent sampling point of that discharger.

(5) Each direct discharger shall ensure that a period of fifteen days exists between the collection of samples under clause (1)(a) and subsection (4).

(6) Each direct discharger shall perform open characterization analyses on each set of samples collected under subsection (4).

(7) Each direct discharger shall collect a set of samples sufficient to perform all of the characterization analyses required by subsection (8) from each cooling water sampling point of that discharger on the same day that samples are collected under subsection 10(1).

(8) Each direct discharger shall perform characterization analyses on each set of samples collected under subsection (7) for the parameters in the analytical test groups listed in the respective Schedule A or Schedule B for that discharger, except for analytical test groups 24 and 27.

DAILY MONITORING

6.-(1) During each operating day, each direct discharger shall collect a set of samples sufficient to perform all of the analyses required by subsection (2) from each sampling point of that discharger.

(2) Each direct discharger shall analyze each set of samples collected under subsection (1) for the parameters specified in the column marked 'D' for the respective effluent stream in the respective site-specific monitoring schedule.

THRICE-WEEKLY MONITORING

7.-(1) On at least three separate operating days in each week, each direct discharger shall collect a set of samples sufficient to perform all of the analyses required by subsection (2) from each sampling point of that discharger.

(2) Each direct discharger shall analyze each set of samples collected under subsection (1) for the parameters specified in the column marked 'TW' for the respective effluent stream in the respective site-specific monitoring schedule.

WEEKLY MONITORING

8.-(1) On at least one operating day in each week on the same day that a set of samples are collected under subsection 7(1) for that effluent stream, each direct discharger shall collect a set of samples sufficient to perform all of the analyses required by subsection (2) from each sampling point of that discharger.

(2) Each direct discharger shall analyze each set of samples collected under subsection (1) for the parameters specified in the column marked 'W' for the respective effluent stream in the respective site-specific monitoring schedule.

(3) For the purposes of subsection (1), samples collected after the first sample collected under subsection (1) shall be collected no sooner than two days after the previous sampling.

WEEKLY MONITORING - POST REGULATION

9.-(1) On at least one operating day in each week, each direct discharger shall collect a set of samples sufficient to perform all of the analyses required by subsection (2) from each final effluent sampling point of that discharger.

(2) Each direct discharger shall analyze each set of samples collected under subsection (1) for the parameters in analytical test groups 2, 3, 4a, 5, 6, 7, 8, 9, 14, 25 and IS1 specified in the columns marked 'D', 'TW' and 'W' for the respective final effluent stream in the respective site specific monitoring schedule.

MONTHLY MONITORING

10.-(1) On at least one operating day in each month on the same day that a set of samples are collected under subsection 7(1) for that effluent stream, each direct discharger shall collect a set of samples sufficient to perform all of the analyses required by subsection (2) from each process subcategory effluent and final effluent sampling point of that discharger.

(2) Each direct discharger shall analyze each set of samples collected under subsection (1) for the parameters specified in the column marked 'M' for the respective effluent stream in the respective site-specific monitoring schedule.

(3) For the purposes of subsection (1), samples collected after the first sample collected under subsection (1) shall be collected no sooner than two weeks after the previous sampling.

MONTHLY MONITORING - COOLING WATER

11.-(1) On the same day that a set of samples required by subsection 10(1) is collected, each direct discharger shall collect a set of samples sufficient to perform all of the analyses required by subsection (2) from each cooling water sampling point of that discharger.

(2) Each direct discharger shall analyze each set of samples collected under subsection (1) for the parameters specified in the column marked 'M' for the respective cooling water effluent stream in the respective site-specific monitoring schedule.

MONTHLY MONITORING - STORM WATER

12.-(1) On a least one operating day in each month, each direct discharger shall collect during a storm water discharge, a set of samples from each storm water effluent sampling point of that discharger sufficient to perform all of the analyses required by subsection (2).

(2) Each direct discharger shall analyze each set of samples collected under subsection (1) for the parameters specified in the column marked 'M' for the respective storm water effluent stream for the respective site specific monitoring schedule .

(3) For the purposes of subsection (1) and subsection (2), where a direct discharger has been unable to collect a set of samples from a storm water sampling point of that discharger during any month, that discharger shall collect a compensating set of samples during a subsequent storm event or thaw for which a set of samples is not collected under subsection (1) sufficient to perform all of the analyses required in the respective site specific monitoring schedule for the respective storm water effluent stream.

EVENT ORIENTATED MONITORING

13.-(1) During each operating day in which process subcategory effluent and final effluent is discharged on an event orientated basis, each direct discharger shall collect grab samples sufficient to perform all of the analyses required by subsection (2) from each process subcategory effluent and final effluent sampling point on each affected process subcategory effluent and final effluent stream of that discharger.

(2) Each direct discharger shall analyze each set of samples collected under subsection (1) for the parameters specified in the column marked 'Event Orientated' for the respective effluent stream in the respective site-specific monitoring schedule .

EVENT ORIENTATED MONITORING - STORAGE SITE EFFLUENT

14.-(1) During each discharge of storage site effluent to a surface watercourse, each direct discharger shall collect a set of samples from each storage site effluent sampling point on each affected storage site effluent stream of that discharger pursuant to subsection (2) and sufficient to perform all of the analyses required by subsection (3).

(2) The collection frequency need not exceed twice per month or twelve times per year.

(3) Each direct discharger shall analyze the samples collected under subsection (1) for the parameters specified in the column marked 'Event Orientated' for the respective storage site effluent stream for the respective site-specific monitoring schedule .

EVENT ORIENTATED MONITORING - WASTE DISPOSAL SITE EFFLUENT

15.-(1) During each discharge of waste disposal site effluent to a surface watercourse, each direct discharger shall collect a set of samples from each waste disposal site effluent sampling point on each affected waste disposal site effluent stream of that discharger pursuant to subsection (2) and sufficient to perform all of the analyses required by subsection (3).

(2) The collection frequency need not exceed twice per month or twelve times per year.

(3) Each direct discharger shall analyze the samples collected under subsection (1) for the parameters specified in the column marked 'Event Orientated' for the respective waste disposal site effluent for the respective site-specific monitoring schedule.

EVENT ORIENTATED MONITORING -EMERGENCY OVERFLOW EFFLUENT

16.-(1) During each emergency overflow, each direct discharger shall collect a set of samples sufficient to perform all of the analyses required by subsection (3) from each emergency overflow effluent sampling point on each affected emergency overflow effluent stream of that discharger.

(2) Subsection (1) does not apply if the collection of samples would result in danger to health or safety.

(3) Each direct discharger shall analyze each set of samples collected under subsection (1) for the parameters specified in the column marked 'Event Orientated' for the respective emergency overflow effluent stream for the respective site specific monitoring Schedule .

QUALITY CONTROL MONITORING

17.-(1) For the purposes of this section, "quality control samples" means,

(a) one duplicate sample for each sample collected under sections 6 to 8 and sections 10, 11 and 13 for analysis for parameters specified in the respective site specific monitoring schedule;

(b) one travelling blank sample for each sample collected under sections 6 to 8 and sections 10, 11 and 13 for analysis for parameters specified in the respective site specific monitoring schedule, except analytical test groups 3 and 8; and

(c) one travelling spiked blank sample for each sample collected under sections 6 to 8 and sections 10, 11 and 13 for analysis for parameters in analytical test groups 16, 17, 19, 20, 23 and 26 specified in the respective site specific monitoring schedule;

(2) Each travelling spiked blank sample required to be analyzed by this section shall be prepared with a standard solution containing at least the parameters to be analyzed for.

(3) Each direct discharger shall, where indicated in the respective site-specific monitoring schedule, collect quality control samples from one process subcategory effluent and one final effluent sampling point of that discharger once in each month concurrent with the sampling required by sections 6 to 8 and shall analyze the samples for the parameters specified in the columns marked 'D', 'TW', and 'W' of the respective site specific monitoring schedule for the respective effluent stream.

(4) Each direct discharger shall, where indicated in the respective site-specific monitoring schedule, collect quality control samples semi-annually from one process subcategory effluent and one final effluent sampling point of that discharger concurrent with the sampling required by section 10 and shall analyze the samples for the analytical test groups specified in the column marked 'M' of the respective site specific monitoring schedule for the respective effluent stream.

(5) Each direct discharger shall, where indicated in the respective site-specific monitoring schedule, collect quality control samples from one process subcategory effluent and one final effluent sampling point of that discharger concurrent with the sampling required by section 13 and shall analyze the samples for the parameters specified in the column marked 'Event Orientated' of the respective site specific monitoring schedule for the respective effluent stream.

(6) Each direct discharger shall where indicated in the respective site specific monitoring schedule, collect quality control samples from one cooling water sampling point of that discharger semi-annually concurrent with the sampling required by sections 8 and 11 and shall analyze the sample for the parameters specified in the columns marked 'W' and 'M' of the respective site specific monitoring schedule for the respective cooling water stream.

TOXICITY TESTING

18.-(1) Each direct discharger shall collect a sample from each final effluent sampling point of that discharger once in each month on the same day as one of the sets of samples required by section 10 is collected, and shall perform thereon a fish toxicity test.

(2) If three consecutive monthly fish toxicity tests performed under subsection (1) for a particular final effluent stream result in mortality for no more than two out of ten fish at each effluent concentration, the direct discharger may thereafter collect the samples and perform the tests required by subsection (1) on 100 per cent undiluted sample only.

(3) If a test performed under subsection (2) results in mortality for more than two out of ten fish, subsection (2) ceases to apply and continues not to apply until the tests performed under subsection (1) in a further three consecutive months result in mortality for no more than two out of ten fish at each effluent concentration.

(4) On at least one operating day in each month, on the same day as one of the sets of samples required by section 10 is collected, each direct discharger shall collect a sample from each final effluent sampling point of that discharger and shall perform thereon a Daphnia magna acute lethality toxicity test.

(5) The sample required by subsection (4) shall be collected together in the same container or set of containers with the fish toxicity test sample.

(6) On at least one operating day in each quarter, on the same day as one of the sets of samples required by section 10 is collected, each direct discharger shall collect a sample from each cooling water sampling point of that discharger and shall perform thereon a fish toxicity test and a Daphnia magna acute lethality toxicity test.

FLOW MEASUREMENT

19.-(1) Pursuant to subsection (2) each direct discharger shall continuously measure and record the flow of each process subcategory and final effluent stream of that discharger at a location or set of locations representative of the flow at the sampling point established for that stream.

(2) Where the direct discharger is unable to continuously measure the flow of a final effluent stream and where the direct discharger is continuously measuring the flow of each process subcategory effluent stream that contributes to that final effluent stream, the direct discharger shall use the flow information from each process subcategory effluent stream that contributes to that final effluent stream to calculate the flow of that final effluent stream.

(3) For the purposes of subsection (2), each direct discharger shall calculate the flow using methods or devices capable of flow measurement accuracy to within plus or minus 20% of the actual flow.

(4) Where the flow of a process subcategory or final effluent stream cannot be continuously measured on any day because of equipment malfunction and all reasonable care has been taken to avoid and correct the malfunction, the direct discharger may fulfil the requirement of subsection (1) by estimating the total daily flow of the stream and recording that estimate.

(5) Each direct discharger shall, at the time of each sampling, measure or estimate the flow of each cooling water stream, storm water effluent stream, emergency overflow effluent stream, storage site effluent stream and waste disposal site effluent stream of that discharger at a location or set of locations representative of the flow at the sampling point established for that stream, and shall record the measured or estimated flow, the date, location and duration of discharge.

REPORTING

20.-(1) Within seven days after this subsection comes into force, each direct discharger shall submit an initial report to the Director in respect of that direct discharger's plant.

(2) Despite subsection (1), the information under subparagraphs 6(ii) and 10(ii) of subsection 7(1) of the General Effluent Monitoring Regulation required by section 7 of that Regulation to be contained in the initial report shall be submitted to the Director within seven days after this Regulation comes into force.

(3) Each direct discharger shall report any changes to the information submitted under subsections (1) and (2) to the Director within thirty days after the end of the month during which the change occurs.

(4) Each direct discharger shall report monthly to the Director the results of all analyses performed by or on behalf of the direct discharger under sections 5 to 18, including all positive numerical values at or above the analytical method detection limits calculated by the laboratory performing the analysis.

(5) Each direct discharger shall report monthly to the Director the flow measurement information recorded under section 19 of this Regulation.

(6) The monthly report referred to in subsection (4) shall be submitted to the Director,

(a) within 60 days after the last day of the week in which samples were collected for analysis for the parameters in analytical test groups 2, 3, 4, 5, 6, 7, 8, 11, 14, 15, 25 and for toxicity testing.

(b) within 90 days after the day in which samples were collected for analysis for the parameters in analytical test groups 9, 10, 12, 16, 17, 19, 20, 23, 24, 26 and 27.

(7) The monthly report referred to in subsection (5) shall be submitted to the Director in writing within thirty days after the end of the month in which the information was recorded by the discharger.

(8) At least thirty days before the collection of the first sample in each month, each direct discharger shall submit to the Director a schedule of intended sampling dates by location for the monthly and characterization sampling for that month.

(9) Each direct discharger shall follow the schedule submitted by the direct discharger under subsection (8) but if the schedule cannot be followed as submitted, the direct discharger shall notify the director immediately of any change in dates or times.

(10) Once in each quarter, each direct discharger shall submit a report to the Director summarizing, the quantities of chemicals added to cooling water and stating the pattern of these additions.

(11) Each direct discharger shall keep records of all sampling required by this Regulation, including, for each sample, the date of collection, the time at which grab samples are taken, the sampling procedures used, the amount of sample dilution by preservative if dilution exceeds one per cent, and any incident likely to affect an analytical result.

(12) Each direct discharger shall develop a maintenance and calibration schedule for all sampling equipment and shall record the results of all maintenance and calibration performed.

(13) No later than one year after this section comes into force, each direct discharge shall submit a report to the Director describing the variation in daily flow for a period of six months for each process subcategory effluent stream and final effluent stream from which samples are collected other than by means of an automatic flow proportional composite sampling device.

(14) If a report required under subsection (13) is not provided, the respective process subcategory effluent stream or final effluent stream shall be deemed to be a variable flow stream on the expiration of three months after the report was due and each sample collected from the effluent sampling point on that stream shall be in accordance with clause 3(4)(a) or (b) of the General Effluent Monitoring Regulation or by means of an on-line analyzer.

(15) The report referred to in subsection (13) shall include the raw data and calculation methods used to produce the report.

(16) Records of all analytical methods used shall be kept by the direct discharger.

(17) Each direct discharger shall submit a report to the Director detailing the date, duration and cause of each sampling, toxicity testing, analytical and flow measurement malfunction or other problem, and remedial action taken, within thirty days after the end of the month in which the malfunction or problem occurs.

(18) All records and reports required to be kept or made by this Regulation shall be retained by the direct discharger for a period of two years after the submission of the last data results.

TIMING

21.-(1) This Regulation, except section 9 and subsection 20(1), comes into force on the first day of the fifth month following promulgation.

(2) Subsection 20(1) comes into force on the first day of the third month following promulgation.

(3) Section 9 comes into force on the first day of the seventeenth month following promulgation and shall continue in force for six months.

(4) Sections 5 to 8 and sections 10 to 18 are revoked one year after the day this Regulation comes into force.

LEGEND FOR SCHEDULES

ATG - Analytical Test Group

D - Daily

TW - Thrice weekly

W - Weekly

M - Monthly

N/A - Not Applicable

4AAP - 4-amino antipyrine method

SCHEDULE A - IRON AND STEEL CHARACTERIZATION PARAMETERS

The following list of parameters apply to: **Algoma Steel**
Dofasco
Stelco Hilton
Stelco Lake Erie Works

ANALYTICAL TEST GROUP #	NAME	PARAMETERS	CAS #s
2	Total cyanide	Total cyanide	57-12-5
3	Hydrogen ion (pH)	Hydrogen ion (pH)	N/A
4a	Nitrogen	Ammonia plus Ammonium	N/A
		Total Kjeldahl nitrogen	N/A
4b		Nitrate + Nitrite	N/A
5	Organic carbon	Dissolved organic carbon (DOC)	N/A
		Total organic carbon (TOC) (NOTE 1)	N/A
6	Total phosphorus	Total phosphorus	7723-14-0
7	Specific conductance	Specific conductance	N/A
8	Suspended solids	Total suspended solids (TSS)	N/A
		Volatile suspended solids (VSS)	N/A
9	Total metals	Aluminum	7429-90-5
		Beryllium	7440-41-7
		Cadmium	7440-43-9
		Chromium	7440-47-3
		Cobalt	7440-48-4
		Copper	7440-50-8
		Lead	7439-92-1
		Molybdenum	7439-98-7
		Nickel	7440-02-0
		Silver	7440-22-4
		Thallium	7440-28-0
		Vanadium	7440-62-2
		Zinc	7440-66-6
10	Hydrides	Antimony	7440-36-0
		Arsenic	7440-38-2
		Selenium	7782-49-2
11	Chromium (Hexavalent)	Chromium (Hexavalent)	7440-47-3
12	Mercury	Mercury	7439-97-6
14	Phenolics (4AAP)	Phenolics (4AAP)	N/A

SCHEDULE A - IRON AND STEEL CHARACTERIZATION PARAMETERS

ANALYTICAL TEST GROUP #	NAME	PARAMETERS	CAS #s
15	Sulphide	Sulphide	N/A
16	Volatiles, Halogenated	1,1,2,2-Tetrachloroethane	79-34-5
		1,1,2-Trichloroethene	79-00-5
		1,1-Dichloroethane	75-34-3
		1,1-Dichloroethylene	75-35-4
		1,2-Dichlorobenzene	95-50-1
		1,2-Dichloroethane (Ethylene dichloride)	107-06-2
		1,2-Dichloropropane	78-87-5
		1,3-Dichlorobenzene	541-73-1
		1,4-Dichlorobenzene	106-46-7
		Bromoform	75-25-2
		Bromomethane	74-83-9
		Carbon tetrachloride	56-23-5
		Chlorobenzene	108-90-7
		Chloroform	67-66-3
		Chloromethane	74-87-3
		Cis-1,3-Dichloropropylene	10061-01-5
		Dibromochloromethane	124-48-1
		Ethylene dibromide	106-93-4
		Methylene chloride	75-09-2
		Tetrachloroethylene (Perchloroethylene)	127-18-4
		Trans-1,2-Dichloroethylene	156-60-5
		Trans-1,3-Dichloropropylene	10061-02-6
		Trichloroethylene	79-01-6
		Trichlorofluoromethane	75-69-4
		Vinyl chloride (Chloroethylene)	75-01-4
17	Volatiles, Non-Halogenated	Benzene	71-43-2
		Styrene	100-42-5
		Toluene	108-88-3
		o-Xylene	95-47-6
		m-Xylene and p-Xylene	108-38-3
			& 106-42-3
19	Extractables, Base Neutral	Acenaphthene	83-32-9
		5-nitro Acenaphthene	602-87-9
		Acenaphthylene	208-96-8
		Anthracene	120-12-7
		Benz(a)anthracene	56-55-3
		Benzo(a)pyrene	50-32-8
		Benzo(b)fluoranthene	205-99-2
		Benzo(g,h,i)perylene	191-24-2
		Benzo(k)fluoranthene	207-08-9
		Biphenyl	92-52-4
		Camphene	79-92-5
		1-Chloronaphthalene	90-13-1

SCHEDULE A - IRON AND STEEL CHARACTERIZATION PARAMETERS

ANALYTICAL TEST GROUP #	NAME	PARAMETERS	CAS #s
19	Extractables, Base Neutral (continued)	2-Chloronaphthalene	91-58-7
		Chrysene	218-01-9
		Dibenz(a,h)anthracene	53-70-3
		Fluoranthene	206-44-0
		Fluorene	86-73-7
		Indeno(1,2,3-cd)pyrene	193-39-5
		Indole	120-72-9
		1-Methylnaphthalene	90-12-0
		2-Methylnaphthalene	91-57-6
		Naphthalene	91-20-3
		Perylene	198-55-0
		Phenanthrene	85-01-8
		Pyrene	129-00-0
		Benzyl butyl phthalate	85-68-7
		Bis(2-ethylhexyl) phthalate	117-81-7
		Di-n-butyl phthalate	84-74-2
		4-Bromophenyl phenyl ether	101-55-3
		4-Chlorophenyl phenyl ether	7005-72-3
		Bis(2-chloroisopropyl)ether	108-60-1
		Bis(2-chloroethyl)ether	111-44-4
		Diphenyl ether	10-184-8
		2,4-Dinitrotoluene	121-14-2
		2,6-Dinitrotoluene	606-20-2
		Bis(2-chloroethoxy)methane	111-91-1
		Diphenylamine	122-39-4
		N-Nitrosodiphenylamine	86-30-6
		N-Nitrosodi-n-propylamine	621-64-7
20	Extractables, Acid (Phenolics)	2,3,4,5-Tetrachlorophenol	4901-51-3
		2,3,4,6-Tetrachlorophenol	58-90-2
		2,3,5,6-Tetrachlorophenol	935-95-5
		2,3,4-Trichlorophenol	15950-66-0
		2,3,5-Trichlorophenol	933-78-8
		2,4,5-Trichlorophenol	95-95-4
		2,4,6-Trichlorophenol	88-06-2
		2,4-Dimethyl phenol	105-67-9
		2,4-Dinitrophenol	51-28-5
		2,4-Dichlorophenol	120-83-2
		2,6-Dichlorophenol	87-65-0
		4,6-Dinitro-o-cresol	534-52-1
		2-Chlorophenol	95-57-8
		4-Chloro-3-methylphenol	59-50-7
		4-Nitrophenol	100-02-7
		m-Cresol	108-39-4
		o-Cresol	95-48-7
		p-Cresol	106-44-5
		Pentachlorophenol	87-86-5
		Phenol	108-95-2

SCHEDULE A - IRON AND STEEL CHARACTERIZATION PARAMETERS

ANALYTICAL TEST GROUP #	NAME	PARAMETERS	CAS #s
23	Extractables, Neutral -Chlorinated	1,2,3,4-Tetrachlorobenzene	634-66-2
		1,2,3,5-Tetrachlorobenzene	634-90-2
		1,2,4,5-Tetrachlorobenzene	95-94-3
		1,2,3-Trichlorobenzene	87-61-6
		1,2,4-Trichlorobenzene	120-82-1
		2,4,5-Trichlorotoluene	6639-30-1
		Hexachlorobenzene	118-74-1
		Hexachlorobutadiene	87-68-3
		Hexachlorocyclopentadiene	77-47-4
		Hexachloroethane	67-72-1
		Octachlorostyrene	29082-74-4
		Pentachlorobenzene	608-93-5
24	Chlorinated Dibenzo-p-dioxins and Dibenzofurans	2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746-01-6
		Octachlorodibenzo-p-dioxin	326-88-7
		Octachlorodibenzofuran	Unavailable
		Total heptachlorinated dibenzo-p-dioxins	Unavailable
		Total heptachlorinated dibenzofurans	Unavailable
		Total hexachlorinated dibenzo-p-dioxins	34465-46-8
		Total hexachlorinated dibenzofurans	Unavailable
		Total pentachlorinated dibenzo-p-dioxins	Unavailable
		Total pentachlorinated dibenzofurans	Unavailable
		Total tetrachlorinated dibenzo-p-dioxins	Unavailable
		Total tetrachlorinated dibenzofurans	Unavailable
25	Solvent Extractables	Oil and grease	
26	Fatty and Resin Acids	Abietic acid	514-10-3
		Chlorodehydroabietic acid	61996-36-7
		Dehydroabietic acid	1740-19-8
		Isopimaric acid	5835-26-7
		Levopimaric acid	79-54-9
		Neoabietic acid	471-77-2
		Oleic acid	112-80-1
		Pimaric acid	127-27-5
27	PCBs (Total)	PCBs (Total)	Unavailable

NOTE 1: Total organic carbon is to be analyzed only if the total suspended solids concentration exceeds 15 milligrams per litre.

SCHEDULE B - IRON AND STEEL CHARACTERIZATION PARAMETERS

The following list of parameters apply to: Atlas Specialty Steel
Ivaco Rolling Mills
Lake Ontario Steel Division of CO - Steel Inc.

ANALYTICAL TEST GROUP #	NAME	PARAMETERS	CAS #s
3	Hydrogen ion (pH)	Hydrogen ion (pH)	N/A
4a	Nitrogen	Ammonia plus Ammonium	N/A
		Total Kjeldahl nitrogen	N/A
4b		Nitrate + Nitrite	N/A
5	Organic carbon	Dissolved organic carbon (DOC)	N/A
		Total organic carbon (TOC) (NOTE 1)	N/A
6	Total phosphorus	Total phosphorus	7723-14-0
7	Specific conductance	Specific conductance	N/A
8	Suspended solids	Total suspended solids (TSS)	N/A
		Volatile suspended solids (VSS)	N/A
9	Total metals	Aluminum	7429-90-5
		Beryllium	7440-41-7
		Cadmium	7440-43-9
		Chromium	7440-47-3
		Cobalt	7440-48-4
		Copper	7440-50-8
		Lead	7439-92-1
		Molybdenum	7439-98-7
		Nickel	7440-02-0
		Silver	7440-22-4
		Thallium	7440-28-0
		Vanadium	7440-62-2
		Zinc	7440-66-6
10	Hydrides	Antimony	7440-36-0
		Arsenic	7440-38-2
		Selenium	7782-49-2
11	Chromium (Hexavalent)	Chromium (Hexavalent)	7440-47-3

SCHEDULE B - IRON AND STEEL CHARACTERIZATION PARAMETERS

ANALYTICAL TEST GROUP #	NAME	PARAMETERS	CAS #s
16	Volatiles, Halogenated	1,1,2,2-Tetrachloroethane	79-34-5
		1,1,2-Trichloroethane	79-00-5
		1,1-Dichloroethane	75-34-3
		1,1-Dichloroethylene	75-35-4
		1,2-Dichlorobenzene	95-50-1
		1,2-Dichloroethane (Ethylene dichloride)	107-06-2
		1,2-Dichloropropane	78-87-5
		1,3-Dichlorobenzene	541-73-1
		1,4-Dichlorobenzene	106-46-7
		Bromoform	75-25-2
		Bromomethane	74-83-9
		Carbon tetrachloride	56-23-5
		Chlorobenzene	108-90-7
		Chloroform	67-66-3
		Chloromethane	74-87-3
		Cis-1,3-Dichloropropylene	10061-01-5
		Dibromochloromethane	124-48-1
		Ethylene dibromide	106-93-4
		Methylene chloride	75-09-2
		Tetrachloroethylene (Perchloroethylene)	127-18-4
		Trans-1,2-Dichloroethylene	156-60-5
		Trans-1,3-Dichloropropylene	10061-02-6
		Trichloroethylene	79-01-6
		Trichlorofluoromethane	75-69-4
		Vinyl chloride (Chloroethylene)	75-01-4
17	Volatiles, Non-Halogenated	Benzene	71-43-2
		Styrene	100-42-5
		Toluene	108-88-3
		o-Xylene	95-47-6
		m-Xylene and p-Xylene	108-38-3
			& 106-42-3
19	Extractables, Base Neutral	Acenaphthene	83-32-9
		5-nitro Acenaphthene	602-87-9
		Acenaphthylene	208-96-8
		Anthracene	120-12-7
		Benz(a)anthracene	56-55-3
		Benzo(a)pyrene	50-32-8
		Benzo(b)fluoranthene	205-99-2
		Benzo(g,h,i)perylene	191-24-2
		Benzo(k)fluoranthene	207-08-9
		Biphenyl	92-52-4
		Camphene	79-92-5
		1-Chloronaphthalene	90-13-1

ANALYTICAL TEST GROUP #	NAME	PARAMETERS	CAS #s
19	Extractables, Base Neutral (continued)	2-Chloronaphthalene	91-58-7
		Chrysene	218-01-9
		Dibenz(a,h)anthracene	53-70-3
		Fluoranthene	206-44-0
		Fluorene	86-73-7
		Indeno(1,2,3-cd)pyrene	193-39-5
		Indole	120-72-9
		1-Methylnaphthalene	90-12-0
		2-Methylnaphthalene	91-57-6
		Naphthalene	91-20-3
		Perylene	198-55-0
		Phenanthrene	85-01-8
		Pyrene	129-00-0
		Benzyl butyl phthalate	85-68-7
		Bis(2-ethylhexyl) phthalate	117-81-7
		Di-n-butyl phthalate	84-74-2
		4-Bromophenyl phenyl ether	101-55-3
		4-Chlorophenyl phenyl ether	7005-72-3
		Bis(2-chloroisopropyl)ether	108-60-1
		Bis(2-chloroethyl)ether	111-44-4
		Diphenyl ether	10-184-8
		2,4-Dinitrotoluene	121-14-2
		2,6-Dinitrotoluene	606-20-2
		Bis(2-chloroethoxy)methane	111-91-1
		Diphenylamine	122-39-4
		N-Nitrosodiphenylamine	86-30-6
		N-Nitrosodi-n-propylamine	621-64-7
20	Extractables, Acid (Phenolics)	2,3,4,5-Tetrachlorophenol	4901-51-3
		2,3,4,6-Tetrachlorophenol	58-90-2
		2,3,5,6-Tetrachlorophenol	935-95-5
		2,3,4-Trichlorophenol	15950-66-0
		2,3,5-Trichlorophenol	933-78-8
		2,4,5-Trichlorophenol	95-95-4
		2,4,6-Trichlorophenol	88-06-2
		2,4-Dimethyl phenol	105-67-9
		2,4-Dinitrophenol	51-28-5
		2,4-Dichlorophenol	120-83-2
		2,6-Dichlorophenol	87-65-0
		4,6-Dinitro-o-cresol	534-52-1
		2-Chlorophenol	95-57-8
		4-Chloro-3-methylphenol	59-50-7
		4-Nitrophenol	100-02-7
		m-Cresol	108-39-4
		o-Cresol	95-48-7
		p-Cresol	106-44-5
		Pentachlorophenol	87-86-5
		Phenol	108-95-2

SCHEDULE B - IRON AND STEEL CHARACTERIZATION PARAMETERS

ANALYTICAL TEST GROUP #	NAME	PARAMETERS	CAS #s
23	Extractables, Neutral -Chlorinated	1,2,3,4-Tetrachlorobenzene	634-66-2
		1,2,3,5-Tetrachlorobenzene	634-90-2
		1,2,4,5-Tetrachlorobenzene	95-94-3
		1,2,3-Trichlorobenzene	87-61-6
		1,2,4-Trichlorobenzene	120-82-1
		2,4,5-Trichlorotoluene	6639-30-1
		Hexachlorobenzene	118-74-1
		Hexachlorobutadiene	87-68-3
		Hexachlorocyclopentadiene	77-47-4
		Hexachloroethane	67-72-1
		Octachlorostyrene	29082-74-4
		Pentachlorobenzene	608-93-5
24	Chlorinated Dibenzo-p-dioxins and Dibenzofurans	2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746-01-6
		Octachlorodibenzo-p-dioxin	326-88-7
		Octachlorodibenzofuran	Unavailable
		Total heptachlorinated dibenzo-p-dioxins	Unavailable
		Total heptachlorinated dibenzofurans	Unavailable
		Total hexachlorinated dibenzo-p-dioxins	34465-46-8
		Total hexachlorinated dibenzofurans	Unavailable
		Total pentachlorinated dibenzo-p-dioxins	Unavailable
		Total pentachlorinated dibenzofurans	Unavailable
		Total tetrachlorinated dibenzo-p-dioxins	Unavailable
		Total tetrachlorinated dibenzofurans	Unavailable
25	Solvent Extractables	Oil and grease	
27	PCBs (Total)	PCBs (Total)	Unavailable

NOTE 1: Total organic carbon is to be analyzed only if the total suspended solids concentration exceeds 15 milligrams per litre.

SCHEDULE C - ANALYTICAL TEST GROUP NUMBERS AND PARAMETERS FOR OPEN CHARACTERIZATION

	ANALYTICAL TEST GROUP NAME	PARAMETERS	CAS #s
28a	Open Characterization - Volatiles	An extension of ATGs 16, 17	
28b	Open Characterization - Extractables	An extension of ATGs 19, 20, 23	
29	Open Characterization - Elemental	Aluminum	7429-90-5
		Antimony	7440-36-0
		Arsenic	7440-38-2
		Barium	7440-39-3
		Beryllium	7440-41-7
		Bismuth	7440-69-9
		Boron	7440-42-8
		Cadmium	7440-43-9
		Calcium	7440-70-2
		Cerium	7440-45-1
		Cesium	7440-46-2
		Chromium	7440-47-3
		Cobalt	7440-48-4
		Copper	7440-50-8
		Dysprosium	7429-91-6
		Erbium	7440-52-0
		Europium	7440-53-1
		Gadolinium	7440-54-2
		Gallium	7440-55-3
		Germanium	7440-56-4
		Gold	7440-57-5
		Hafnium	7440-58-6
		Holmium	7440-60-0
		Indium	7440-74-6
		Iridium	7439-88-5
		Iron	7439-89-6
		Lanthanum	7439-91-0
		Lead	7439-92-1
		Lithium	7439-93-2
		Lutetium	7439-94-3
		Magnesium	7439-95-4
		Manganese	7439-96-5
		Mercury	7439-97-6
		Molybdenum	7439-98-7
		Neodymium	7440-00-8
		Nickel	7440-02-0
		Niobium	7440-03-1
		Osmium	7440-04-2
		Palladium	7440-05-3
		Phosphorus	7723-14-0
		Platinum	7440-06-4
		Potassium	7440-09-7
		Praseodymium	7440-10-0
		Rhenium	7440-15-5
		Rhodium	7440-16-6
		Rubidium	7440-17-7

SCHEDULE C - ANALYTICAL TEST GROUP NUMBERS AND PARAMETERS FOR OPEN CHARACTERIZATION

	ANALYTICAL TEST GROUP NAME	PARAMETERS	CAS #s
29	Open Characterization - Elemental (continued)	Ruthenium	7440-18-8
		Samarium	7440-19-9
		Scandium	7440-20-2
		Selenium	7782-49-2
		Silicon	7440-21-3
		Silver	7440-22-4
		Sodium	7440-02-35
		Strontium	7440-24-6
		Sulfur	7704-34-9
		Tantalum	7440-25-7
		Tellurium	13494-80-9
		Terbium	7440-27-9
		Thallium	7440-28-0
		Thorium	7440-29-1
		Thulium	7440-30-4
		Tin	7440-31-5
		Titanium	7440-32-6
		Tungsten	7440-33-7
		Uranium	7440-61-1
		Vanadium	7440-62-2
		Ytterbium	7440-64-4
		Yttrium	7440-65-5
		Zinc	7440-66-6
		Zirconium	7440-67-7

SCHEDULE D - SAMPLING PRINCIPLES

Column 1 ANALYTICAL TEST GROUP	Column 2 LABORATORY SAMPLE CONTAINER	Column 3 LABORATORY CONTAINER PRE-TREATMENT	Column 4 TEST SPECIFIC SAMPLING PRECAUTIONS	Col. 5 MIN. SAM. VOL.	Column 6 PRESERVATION METHOD	Column 7 MAX. STORAGE TIME (DAYS)
Fatty and Resin Acids						
26	Amber glass or fluorocarbon resin with fluorocarbon resin lined cap.	If pre-treatment necessary: Bottle: Sequence of extensive washing/hot water, detergent, water, distilled water. Bake at 300° C for 8 h minimum or 3 rinses with pesticide grade or distilled in glass hexane and dichloromethane. Cap: no pre-treatment.	Contact surfaces must be glass, fluorocarbon resin or stainless steel.	800mL	None	7
Urea						
151	Sample containers and caps/ liners must be composed only of one or more of the following materials: fluorocarbon resin, polyethylene terephthalate, glass, polystyrene, polypropylene, high or low density polyethylene. Metallic foil should not be used.	If pre-treatment necessary, soak overnight in a 5% solution of nitric acid (HNO_3), followed by several rinses in distilled water.	If sample is high (>5%) in hydrocarbons or organic solvents, use glass or fluorocarbon resin sample container only.	100mL	Add nitric acid (HNO_3) (containing < 1 mg/L of all analytes) to lower pH to <2.	30

SCHEDULE E - ANALYTICAL PRINCIPLES & ANALYTICAL METHOD DETECTION LIMITS

Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
ANALYTICAL TEST GROUP •	PARAMETERS CONVENTIONAL AND METAL PARAMETERS	SAMPLE PREPARATION METHOD PRINCIPLES	INSTRUMENTAL MEASUREMENT METHOD PRINCIPLES	ALTERNATE INSTRUMENTAL MEASUREMENT METHOD PRINCIPLES	ANALYTICAL METHOD DETECTION LIMITS
26	Abietic acid	pH adjusted to 9 Liquid/liquid extraction with methyl t-butyl ether Methylation	Gas Chromatography/ Flame Ionization Detection Capillary column	N/A	
	Chlorodehydroabietic acid				
	Dehydroabietic acid				
	Isopimaric acid				
	Levopimaric acid				
	Neoabietic acid				
	Oleic acid				
	Pimaric acid				
IS1	Iron	Nitric evaporation or aqua regia digestion	Atomic absorption spectrometry and/or Emission Spectrometry - Inductively Coupled Plasma (ICP) or Direct Current Argon Plasma Spectrometry (DCP)	Polarography via the method of standard addition in the presence of suitable electrolyte	0.02 mg/L

SAMPLING LOCATION	STREAM CLASSIFICATION	CONSTITUENT PROCESS SUBCATEGORY EFFLUENT
ALGOMA STEEL		
By-Products Area	Process Subcategory Effluent	Cokemaking
#2 Thickener	Process Subcategory Effluent	Ironmaking
#1 Thickener	Process Subcategory Effluent	Sintering Steelmaking (wet process) Acid Pickling Cold Forming
Tube Mill	Process Subcategory Effluent	Hot Forming
Terminal Settling Basins	Final Effluent	Cokemaking Cold Forming
Bar and Strip Lagoon Outfall	Final Effluent	Ironmaking Steelmaking
Cold Mill 24"	Cooling Water	
Cold Mill 20"	Cooling Water	
60" Sewer Outfall	Cooling Water	
30" Sewer Outfall	Cooling Water	
Cold Mill Storm Sewer Outfall	Storm Water	
ATLAS SPECIALITY STEEL		
Waste Acid Solidification Plant	Process Subcategory Effluent	Acid Pickling
North Plant Treatment	Process Subcategory Effluent	Hot Forming Steelmaking (wet process) Acid Pickling
CEVAM	Recycled Process Water for Cooling	
42" Sewer	Final Effluent	Hot Forming Steelmaking Acid Pickling
Waste Disposal Site	Waste Disposal Site Effluent	
South Plant Water Reclaim	Emergency Overflow	
North Plant Water Reclaim at 42" Sewer	Emergency Overflow	
R & D	Storm Water	

SCHEDULE F - REGULATED EFFLUENT STREAMS FOR MONITORING

SAMPLING LOCATION	STREAM CLASSIFICATION	CONSTITUENT PROCESS SUBCATEGORY EFFLUENT
DOFASCO		
Coke Plant Biological Plant Discharge	Process Subcategory Effluent	Cokemaking
Blast Furnace Recycle Blowdown	Process Subcategory Effluent	Ironmaking
Steelmaking Clarifier Discharge	Process Subcategory Effluent	Steelmaking (wet process)
#1 Hot Mill Filtration Plant Discharge	Process Subcategory Effluent	Hot Forming
Cold Mill Treatment Plant Discharge	Process Subcategory Effluent	Cold Forming
Ottawa Sewer	Final Effluent	Hot Forming
West Bayfront Sewer	Final Effluent	Cokemaking Ironmaking Steelmaking (wet process)
East Boat Slip Sewer	Final Effluent	Cokemaking Steelmaking (wet process)
Boilerhouse Sewer #1	Cooling Water	
Boilerhouse Sewer #2	Cooling Water	
Southeast Coal Fields Storm Sewer	Storage Site Effluent	
Kenilworth Plant Storm Sewer	Storm Water	
IVACO ROLLING MILLS		
East Discharge	Cooling Water	
North-East Discharge	Storm Water	
Mill Pond Outlet	Process Subcategory Effluent	Hot Forming
East Discharge	Final Effluent	Hot Forming
LAKE ONTARIO STEEL DIVISION OF CO - STEEL INC.		
South Pond	Final Effluent	Hot Forming
Storm Water Discharge Point	Storm Water	
Waste Disposal Site	Waste Disposal Site Effluent	

SCHEDULE F - REGULATED EFFLUENT STREAMS FOR MONITORING

SAMPLING LOCATION	STREAM CLASSIFICATION	CONSTITUENT PROCESS SUBCATEGORY EFFLUENT
STELCO HILTON		
#2 Rod Mill	Final Effluent	Hot Forming
20" Mill	Final Effluent	Hot Forming
#1 60" Sewer	Process Subcategory Effluent	Acid Pickling
East Side Filter Plant	Final Effluent	Cokemaking Sintering Hot Forming Cold Forming Steelmaking (wet process)
North Outfall	Final Effluent	Hot Forming
West-Side Open Cut	Cooling Water	
North-West Outfall	Cooling Water	
#2 60" Sewer	Storm Water	
East Side Filter Plant Overflow Weir	Emergency Overflow	
STELCO LAKE ERIE WORKS		
Blowdown Treatment Plant	Process Subcategory Effluent	Cokemaking Ironmaking Steelmaking (wet process) Hot Forming
#4 Pond Discharge	Final Effluent	Cokemaking Ironmaking Steelmaking (wet process) Hot Forming
Storm Water Pond #2	Storm Water	
Lagoon E	Waste Disposal Site Effluent	

SCHEDULE 1: ALGOMA STEEL

		NAME OF STREAM:	By-Products Area		#2 Thickener	#1 Thickener	Tube Mill
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	No		No	No	No
		CHARACTERIZATION FREQUENCY (except for ATGs 24 and 27):	None		None	None	None
		CHARACTERIZATION FREQUENCY FOR ATGs 24 and 27:	None		None	None	None
		OPEN CHARACTERIZATION FREQUENCY:	None		None	None	None
		QUALITY CONTROL MONITORING REQUIRED:	Yes		No	No	No
		FREQUENCY OF SAMPLING:	TW	M	TW	TW	TW
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED					
2	Cyanide	Cyanide	●●●		●●●	●●●	
3	Hydrogen ion (pH)	Hydrogen ion (pH)				●●●	●●●
4a	Nitrogen	Ammonia plus Ammonium	●●●		●●●	●●●	
		Total Kjeldahl nitrogen					
4b		Nitrate + Nitrite					
5	Organic carbon (TOC/DOC)	Dissolved organic carbon (DOC)					
		Total organic carbon (TOC)					
6	Total phosphorus	Total phosphorus					
7	Specific conductance	Specific conductance					
8	Suspended solids (TSS/VSS)	Total suspended solids (TSS)	●●●		●●●	●●●	●●●
		Volatile suspended solids (VSS)	●●●		●●●	●●●	●●●
9	Total metals	Aluminum					
		Beryllium					
		Cadmium					
		Chromium				●●●	
		Cobalt					
		Copper					
		Lead				●●●	●●●
		Molybdenum					
		Nickel					

SCHEDULE 1: ALGOMA STEEL

		NAME OF STREAM:	By-Products Area		#2 Thickener	#1 Thickener	Tube Mill
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	No		No	No	No
		CHARACTERIZATION FREQUENCY (except for ATGs 24 and 27):	None		None	None	None
		CHARACTERIZATION FREQUENCY FOR ATGs 24 and 27:	None		None	None	None
		OPEN CHARACTERIZATION FREQUENCY:	None		None	None	None
		QUALITY CONTROL MONITORING REQUIRED:	Yes		No	No	No
		FREQUENCY OF SAMPLING:	TW	M	TW	TW	TW
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED					
9	Total metals (continued)	Silver					
		Thallium					
		Vanadium					
		Zinc			●●●	●●●	●●●
10	Hydrides	Antimony					
		Arsenic					
		Selenium					
12	Mercury	Mercury					
14	Phenolics (4AAP)	Phenolics (4AAP)	●●●		●●●	●●●	
15	Sulphide	Sulphide					
16	Volatiles, Halogenated	1,1,2,2-Tetrachloroethane					
		1,1,2-Trichloroethane					
		1,1-Dichloroethane					
		1,1-Dichloroethylene					
		1,2-Dichlorobenzene					
		1,2-Dichloroethane (Ethylene dichloride)					
		1,2-Dichloropropane					
		1,3-Dichlorobenzene					
		1,4-Dichlorobenzene					
		Bromoform					
		Bromomethane					

SCHEDULE 1: ALGOMA STEEL

		NAME OF STREAM:	By-Products Area		#2 Thickener	#1 Thickener	Tube Mill
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	No		No	No	No
		CHARACTERIZATION FREQUENCY (except for ATGs 24 and 27):	None		None	None	None
		CHARACTERIZATION FREQUENCY FOR ATGs 24 and 27:	None		None	None	None
		OPEN CHARACTERIZATION FREQUENCY:	None		None	None	None
		QUALITY CONTROL MONITORING REQUIRED:	Yes		No	No	No
		FREQUENCY OF SAMPLING:	TW	M	TW	TW	TW
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED					
16	Volatiles, Halogenated (continued)	Carbon tetrachloride					
		Chlorobenzene					
		Chloroform					
		Chloromethane					
		Cis-1,3-Dichloropropylene					
		Dibromochloromethane					
		Ethylene dibromide					
		Methylene chloride					
		Tetrachloroethylene (Perchloroethylene)					
		Trans-1,2-Dichloroethylene					
		Trans-1,3-Dichloropropylene					
		Trichloroethylene					
		Trichlorofluoromethane					
		Vinyl chloride (Chloroethylene)					
17	Volatiles, Non-Halogenated	Benzene	●●●				
		Styrene		●●●			
		Toluene		●●●			
		o-Xylene		●●●			
		m-Xylene and p-Xylene		●●●			
19	Extractables, Base Neutral	Acenaphthene		●●●			
		5-nitro Acenaphthene		●●●			
		Acenaphthylene		●●●			
		Anthracene		●●●			
		Benz(a)anthracene		●●●			
		Benzo(a)pyrene	●●●				
		Benzo(b)fluoranthene		●●●			

SCHEDULE 1: ALGOMA STEEL

		NAME OF STREAM:	By-Products Area		#2 Thickener	#1 Thickener	Tube Mill
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	No		No	No	No
		CHARACTERIZATION FREQUENCY (except for ATGs 24 and 27):	None		None	None	None
		CHARACTERIZATION FREQUENCY FOR ATGs 24 and 27:	None		None	None	None
		OPEN CHARACTERIZATION FREQUENCY:	None		None	None	None
		QUALITY CONTROL MONITORING REQUIRED:	Yes		No	No	No
		FREQUENCY OF SAMPLING:	TW	M	TW	TW	TW
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED					
19	Extractables, Base Neutral (continued)	Benzo(g,h,i)perylene		•••			
		Benzo(k)fluoranthene		•••			
		Biphenyl		•••			
		Camphene		•••			
		1-Chloronaphthalene		•••			
		2-Chloronaphthalene		•••			
		Chrysene		•••			
		Dibenz(a,h)anthracene		•••			
		Fluoranthene		•••			
		Fluorene		•••			
		Indeno(1,2,3-cd)pyrene		•••			
		Indole		•••			
		1-Methylnaphthalene		•••			
		2-Methylnaphthalene		•••			
		Naphthalene	•••				
		Perylene		•••			
		Phenanthrene		•••			
		Pyrene		•••			
		Benzyl butyl phthalate		•••			
		Bis(2-ethylhexyl) phthalate		•••			
		Di-n-butyl phthalate		•••			
		4-Bromophenyl phenyl ether		•••			
		4-Chlorophenyl phenyl ether		•••			
		Bis(2-chloroisopropyl)ether		•••			
		Bis(2-chloroethyl)ether		•••			
		Diphenyl ether		•••			

SCHEDULE 1: ALGOMA STEEL

FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:		NAME OF STREAM:	By-Products Area	*2 Thickener	*1 Thickener	Tube Mill	
CHARACTERIZATION FREQUENCY (except for ATEs 24 and 27):			No	No	No	No	
CHARACTERIZATION FREQUENCY FOR ATEs 24 and 27):			None	None	None	None	
OPEN CHARACTERIZATION FREQUENCY:			None	None	None	None	
QUALITY CONTROL MONITORING REQUIRED:			None	None	None	None	
ANALYTICAL TEST GROUP		FREQUENCY OF SAMPLING:	Yes	None	None	None	
		PARAMETERS TO BE ANALYZED	TW	M	No	No	No
19	Extractables, Base Neutral (continued)	2,4-Dinitrotoluene			TW	TW	TW
		2,6-Dinitrotoluene					
		Bis(2-chloroethoxy)methane					
		Diphenylamine	•••				
		N-Nitrosodiphenylamine	•••				
		N-Nitrosodi-n-propylamine	•••				
20	Extractables, Acid (Phenolics)	2,3,4,5-Tetrachlorophenol	•••				
		2,3,4,6-Tetrachlorophenol					
		2,3,5,6-Tetrachlorophenol					
		2,3,4-Trichlorophenol					
		2,3,5-Trichlorophenol					
		2,4,5-Trichlorophenol					
		2,4,6-Trichlorophenol					
		2,4-Dimethyl phenol					
		2,4-Dinitrophenol					
		2,4-Dichlorophenol					
		2,6-Dichlorophenol					
		4,6-Dinitro-o-cresol					
		2-Chlorophenol					
		4-Chloro-3-methylphenol					
		4-Nitrophenol					
		m-Cresol					
		o-Cresol					
		p-Cresol					
		Pentachlorophenol					
		Phenol					

SCHEDULE 1: ALGOMA STEEL

		NAME OF STREAM:	By-Products Area		#2 Thickener	#1 Thickener	Tube Mill
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	No		No	No	No
		CHARACTERIZATION FREQUENCY (except for ATGs 24 and 27):	None		None	None	None
		CHARACTERIZATION FREQUENCY FOR ATGs 24 and 27:	None		None	None	None
		OPEN CHARACTERIZATION FREQUENCY:	None		None	None	None
		QUALITY CONTROL MONITORING REQUIRED:	Yes		No	No	No
		FREQUENCY OF SAMPLING:	TW	M	TW	TW	TW
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED					
23	Extractables, Neutral -Chlorinated	1,2,3,4-Tetrachlorobenzene					
		1,2,3,5-Tetrachlorobenzene					
		1,2,4,5-Tetrachlorobenzene					
		1,2,3-Trichlorobenzene					
		1,2,4-Trichlorobenzene					
		2,4,5-Trichlorotoluene					
		Hexachlorobenzene					
		Hexachlorobutadiene					
		Hexachlorocyclopentadiene					
		Hexachloroethane					
		Octachlorostyrene					
		Pentachlorobenzene					
25	Solvent Extractables	Oil and grease	•••			•••	•••
151	Iron	Iron					

* Daphnia Magna Acute Lethality Toxicity Test

SCHEDULE 1: ALGOMA STEEL

		Terminal Settling Basins				Bar & Strip Lagoon Outfall				Cold Mill 24"			Cold Mill 20"	
NAME OF STREAM:														
FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:		Yes				Yes				Yes			Yes	
CHARACTERIZATION FREQUENCY (except for ATGs 24 and 27):		Quarterly				Quarterly				Quarterly			Quarterly	
CHARACTERIZATION FREQUENCY FOR ATGs 24 and 27:		Semi-annually				Semi-annually				None			None	
OPEN CHARACTERIZATION FREQUENCY:		Quarterly				Quarterly				None			None	
QUALITY CONTROL MONITORING REQUIRED:		Yes				No				No			No	
FREQUENCY OF SAMPLING:		D	TW	W	M	D	TW	W	M	D	W	M	D	M
ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED													
2 Cyanide	Cyanide			●●●				●●●				●●●		●●●
3 Hydrogen ion (pH)	Hydrogen ion (pH)	●●●				●●●				●●●			●●●	
4a Nitrogen	Ammonia plus Ammonium			●●●				●●●				●●●		●●●
	Total Kjeldahl nitrogen													
4b	Nitrate + Nitrite													
5 Organic carbon (TOC/DOC)	Dissolved organic carbon (DOC)		●●●				●●●					●●●		●●●
	Total organic carbon (TOC)													
6 Total phosphorus	Total phosphorus			●●●				●●●				●●●		●●●
7 Specific conductance	Specific conductance	●●●				●●●								
8 Suspended solids (TSS/VSS)	Total suspended solids (TSS)	●●●				●●●					●●●			●●●
	Volatile suspended solids (VSS)	●●●				●●●					●●●			●●●
9 Total metals	Aluminum				●●●				●●●					
	Beryllium				●●●				●●●					
	Cadmium				●●●				●●●					
	Chromium				●●●				●●●					
	Cobalt				●●●				●●●					
	Copper				●●●				●●●					
	Lead				●●●				●●●			●●●		●●●
	Molybdenum				●●●				●●●					
	Nickel				●●●				●●●					

SCHEDULE 1: ALGOMA STEEL

		NAME OF STREAM:	Terminal Settling Basins				Bar & Strip Lagoon Outfall				Cold Mill 24"			Cold Mill 20"	
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	Yes				Yes				Yes			Yes	
		CHARACTERIZATION FREQUENCY (except for ATGs 24 and 27):	Quarterly				Quarterly				Quarterly			Quarterly	
		CHARACTERIZATION FREQUENCY FOR ATGs 24 and 27:	Semi-annually				Semi-annually				None			None	
		OPEN CHARACTERIZATION FREQUENCY:	Quarterly				Quarterly				None			None	
		QUALITY CONTROL MONITORING REQUIRED:	Yes				No				No			No	
		FREQUENCY OF SAMPLING:	D	TW	W	M	D	TW	W	M	D	W	M	D	M
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED													
9	Total metals (continued)	Silver													
		Thallium				●●●				●●●					
		Vanadium				●●●				●●●					
		Zinc				●●●				●●●					
						●●●			●●●				●●●		●●●
10	Hydrides	Antimony													
		Arsenic				●●●				●●●					
		Selenium				●●●				●●●					
						●●●				●●●					
12	Mercury	Mercury													
						●●●									
14	Phenolics (4AAP)	Phenolics (4AAP)													
					●●●				●●●				●●●		●●●
15	Sulphide	Sulphide													
					●●●										
16	Volatiles, Halogenated	1,1,2,2-Tetrachloroethane													
		1,1,2-Trichloroethane				●●●				●●●					
		1,1-Dichloroethane				●●●				●●●					
		1,1-Dichloroethylene				●●●				●●●					
		1,2-Dichlorobenzene				●●●				●●●					
		1,2-Dichloroethane (Ethylene dichloride)				●●●				●●●					
		1,2-Dichloropropane				●●●				●●●					
		1,3-Dichlorobenzene				●●●				●●●					
		1,4-Dichlorobenzene				●●●				●●●					
		Bromoform				●●●				●●●					
		Bromomethane				●●●				●●●					

SCHEDULE 1: ALGOMA STEEL

		NAME OF STREAM:	Terminal Settling Basins				Bar & Strip Lagoon Outfall				Cold Mill 24"			Cold Mill 20"	
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	Yes				Yes				Yes			Yes	
		CHARACTERIZATION FREQUENCY (except for ATGs 24 and 27):	Quarterly				Quarterly				Quarterly			Quarterly	
		CHARACTERIZATION FREQUENCY FOR ATGs 24 and 27:	Semi-annually				Semi-annually				None			None	
		OPEN CHARACTERIZATION FREQUENCY:	Quarterly				Quarterly				None			None	
		QUALITY CONTROL MONITORING REQUIRED:	Yes				No				No			No	
		FREQUENCY OF SAMPLING:	D	TW	W	M	D	TW	W	M	D	W	M	D	M
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED													
16	Volatiles, Halogenated (continued)	Carbon tetrachloride				●●●				●●●					
		Chlorobenzene				●●●				●●●					
		Chloroform				●●●				●●●					
		Chloromethane				●●●				●●●					
		Cis-1,3-Dichloropropylene				●●●				●●●					
		Dibromochloromethane				●●●				●●●					
		Ethylene dibromide				●●●				●●●					
		Methylene chloride				●●●				●●●					
		Tetrachloroethylene (Perchloroethylene)				●●●				●●●					
		Trans-1,2-Dichloroethylene				●●●				●●●					
		Trans-1,3-Dichloropropylene				●●●				●●●					
		Trichloroethylene				●●●				●●●					
		Trichlorofluoromethane				●●●				●●●					
		Vinyl chloride (Chloroethylene)				●●●				●●●					
17	Volatiles, Non-Halogenated	Benzene				●●●				●●●					
		Styrene				●●●				●●●					
		Toluene				●●●				●●●					
		o-Xylene				●●●				●●●					
		m-Xylene and p-Xylene				●●●				●●●					
19	Extractables, Base Neutral	Acenaphthene				●●●				●●●					
		5-nitro Acenaphthene				●●●				●●●					
		Acenaphthylene				●●●				●●●					
		Anthracene				●●●				●●●					
		Benz(a)anthracene				●●●				●●●					
		Benzo(a)pyrene				●●●				●●●					
		Benzo(b)fluoranthene				●●●				●●●					

SCHEDULE 1: ALGOMA STEEL

		NAME OF STREAM:	Terminal Settling Basins				Bar & Strip Lagoon Outfall				Cold Mill 24"			Cold Mill 20"	
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	Yes				Yes				Yes			Yes	
		CHARACTERIZATION FREQUENCY (except for ATGs 24 and 27):	Quarterly				Quarterly				Quarterly			Quarterly	
		CHARACTERIZATION FREQUENCY FOR ATGs 24 and 27:	Semi-annually				Semi-annually				None			None	
		OPEN CHARACTERIZATION FREQUENCY:	Quarterly				Quarterly				None			None	
		QUALITY CONTROL MONITORING REQUIRED:	Yes				No				No			No	
		FREQUENCY OF SAMPLING:	D	TW	W	M	D	TW	W	M	D	W	M	D	M
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED													
19	Extractables, Base Neutral (continued)	Benzo(g,h,i)perylene				●●●				●●●					
		Benzo(k)fluoranthene				●●●				●●●					
		Biphenyl				●●●				●●●					
		Camphene				●●●				●●●					
		1-Chloronaphthalene				●●●				●●●					
		2-Chloronaphthalene				●●●				●●●					
		Chrysene				●●●				●●●					
		Dibenz(a,h)anthracene				●●●				●●●					
		Fluoranthene				●●●				●●●					
		Fluorene				●●●				●●●					
		Indeno(1,2,3-cd)pyrene				●●●				●●●					
		Indole				●●●				●●●					
		1-Methylnaphthalene				●●●				●●●					
		2-Methylnaphthalene				●●●				●●●					
		Naphthalene				●●●				●●●					
		Perylene				●●●				●●●					
		Phenanthrene				●●●				●●●					
		Pyrene				●●●				●●●					
		Benzyl butyl phthalate				●●●				●●●					
		Bis(2-ethylhexyl) phthalate				●●●				●●●					
		Di-n-butyl phthalate				●●●				●●●					
		4-Bromophenyl phenyl ether				●●●				●●●					
		4-Chlorophenyl phenyl ether				●●●				●●●					
		Bis(2-chloroisopropyl)ether				●●●				●●●					
		Bis(2-chloroethyl)ether				●●●				●●●					
		Diphenyl ether				●●●				●●●					

SCHEDULE 1: ALGOMA STEEL

		NAME OF STREAM:	Terminal Settling Basins				Bar & Strip Lagoon Outfall				Cold Mill 24"			Cold Mill 20"	
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	Yes				Yes				Yes			Yes	
		CHARACTERIZATION FREQUENCY (except for ATGs 24 and 27):	Quarterly				Quarterly				Quarterly			Quarterly	
		CHARACTERIZATION FREQUENCY FOR ATGs 24 and 27:	Semi-annually				Semi-annually				None			None	
		OPEN CHARACTERIZATION FREQUENCY:	Quarterly				Quarterly				None			None	
		QUALITY CONTROL MONITORING REQUIRED:	Yes				No				No			No	
		FREQUENCY OF SAMPLING:	D	TW	W	M	D	TW	W	M	D	W	M	D	M
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED*													
19	Extractables, Base Neutral (continued)	2,4-Dinitrotoluene				●●●				●●●					
		2,6-Dinitrotoluene				●●●				●●●					
		Bis(2-chloroethoxy)methane				●●●				●●●					
		Diphenylamine				●●●				●●●					
		N-Nitrosodiphenylamine				●●●				●●●					
		N-Nitrosodi-n-propylamine				●●●				●●●					
20	Extractables, Acid (Phenolics)	2,3,4,5-Tetrachlorophenol				●●●				●●●					
		2,3,4,6-Tetrachlorophenol				●●●				●●●					
		2,3,5,6-Tetrachlorophenol				●●●				●●●					
		2,3,4-Trichlorophenol				●●●				●●●					
		2,3,5-Trichlorophenol				●●●				●●●					
		2,4,5-Trichlorophenol				●●●				●●●					
		2,4,6-Trichlorophenol				●●●				●●●					
		2,4-Dimethyl phenol				●●●				●●●					
		2,4-Dinitrophenol				●●●				●●●					
		2,4-Dichlorophenol				●●●				●●●					
		2,6-Dichlorophenol				●●●				●●●					
		4,6-Dinitro-o-cresol				●●●				●●●					
		2-Chlorophenol				●●●				●●●					
		4-Chloro-3-methylphenol				●●●				●●●					
		4-Nitrophenol				●●●				●●●					
		m-Cresol				●●●				●●●					
		o-Cresol				●●●				●●●					
		p-Cresol				●●●				●●●					
		Pentachlorophenol				●●●				●●●					
		Phenol				●●●				●●●					

SCHEDULE 1: ALGOMA STEEL

		NAME OF STREAM:	Terminal Settling Basins				Bar & Strip Lagoon Outfall				Cold Mill 24"			Cold Mill 20"	
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	Yes				Yes				Yes			Yes	
		CHARACTERIZATION FREQUENCY (except for ATGs 24 and 27):	Quarterly				Quarterly				Quarterly			Quarterly	
		CHARACTERIZATION FREQUENCY FOR ATGs 24 and 27:	Semi-annually				Semi-annually				None			None	
		OPEN CHARACTERIZATION FREQUENCY:	Quarterly				Quarterly				None			None	
		QUALITY CONTROL MONITORING REQUIRED:	Yes				No				No			No	
		FREQUENCY OF SAMPLING:	D	TW	W	M	D	TW	W	M	D	W	M	D	M
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED													
23	Extractables, Neutral -Chlorinated	1,2,3,4-Tetrachlorobenzene				●●●				●●●					
		1,2,3,5-Tetrachlorobenzene				●●●				●●●					
		1,2,4,5-Tetrachlorobenzene				●●●				●●●					
		1,2,3-Trichlorobenzene				●●●				●●●					
		1,2,4-Trichlorobenzene				●●●				●●●					
		2,4,5-Trichlorotoluene				●●●				●●●					
		Hexachlorobenzene				●●●				●●●					
		Hexachlorobutadiene				●●●				●●●					
		Hexachlorocyclopentadiene				●●●				●●●					
		Hexachloroethane				●●●				●●●					
		Octachlorostyrene				●●●				●●●					
		Pentachlorobenzene				●●●				●●●					
25	Solvent Extractables	Oil and grease	●●●				●●●						●●●		●●●
IS1	Iron	Iron			●●●				●●●				●●●		●●●

* Daphnia Magna Acute Lethality Toxicity Test

SCHEDULE 1: ALGOMA STEEL

NAME OF STREAM:			60" Sewer Outfall		30" Sewer Outfall		Cold Mill Storm Sewer Outfall
FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:			Yes		Yes		No
CHARACTERIZATION FREQUENCY (except for ATGs 24 and 27):			Quarterly		Quarterly		None
CHARACTERIZATION FREQUENCY FOR ATGs 24 and 27:			None		None		None
OPEN CHARACTERIZATION FREQUENCY:			None		None		None
QUALITY CONTROL MONITORING REQUIRED:			No		Yes		None
FREQUENCY OF SAMPLING:			D	M	D	M	No
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED					M
2	Cyanide	Cyanide		●●●		●●●	●●●
3	Hydrogen ion (pH)	Hydrogen ion (pH)	●●●		●●●		
4a	Nitrogen	Ammonia plus Ammonium		●●●		●●●	●●●
		Total Kjeldahl nitrogen					
4b		Nitrate + Nitrite					
5	Organic carbon (TOC/DOC)	Dissolved organic carbon (DOC)		●●●		●●●	
		Total organic carbon (TOC)					
6	Total phosphorus	Total phosphorus		●●●		●●●	
7	Specific conductance	Specific conductance					
8	Suspended solids (TSS/VSS)	Total suspended solids (TSS)		●●●		●●●	●●●
		Volatile suspended solids (VSS)		●●●		●●●	●●●
9	Total metals	Aluminum					
		Beryllium					
		Cadmium					
		Chromium					
		Cobalt					●●●
		Copper					
		Lead		●●●		●●●	●●●
		Molybdenum					
		Nickel					

SCHEDULE 1: ALGOMA STEEL

		NAME OF STREAM:	60" Sewer Outfall		30" Sewer Outfall		Cold Mill Storm Sewer Outfall
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	Yes		Yes		No
		CHARACTERIZATION FREQUENCY (except for ATGs 24 and 27):	Quarterly		Quarterly		None
		CHARACTERIZATION FREQUENCY FOR ATGs 24 and 27:	None		None		None
		OPEN CHARACTERIZATION FREQUENCY:	None		None		None
		QUALITY CONTROL MONITORING REQUIRED:	No		Yes		No
		FREQUENCY OF SAMPLING:	D	M	D	M	M
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED					
9	Total metals (continued)	Silver					
		Thallium					
		Vanadium					
		Zinc		•••		•••	•••
10	Hydrides	Antimony					
		Arsenic					
		Selenium					
12	Mercury	Mercury					
14	Phenolics (4AAP)	Phenolics (4AAP)		•••		•••	•••
15	Sulphide	Sulphide					
16	Volatiles, Halogenated	1,1,2,2-Tetrachloroethane					
		1,1,2-Trichloroethane					
		1,1-Dichloroethane					
		1,1-Dichloroethylene					
		1,2-Dichlorobenzene					
		1,2-Dichloroethane (Ethylene dichloride)					
		1,2-Dichloropropane					
		1,3-Dichlorobenzene					
		1,4-Dichlorobenzene					
		Bromoform					
		Bromomethane					

SCHEDULE 1: ALGOMA STEEL

		NAME OF STREAM:	60" Sewer Outfall		30" Sewer Outfall		Cold Mill Storm Sewer Outfall
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	Yes		Yes		No
		CHARACTERIZATION FREQUENCY (except for ATGs 24 and 27):	Quarterly		Quarterly		None
		CHARACTERIZATION FREQUENCY FOR ATGs 24 and 27:	None		None		None
		OPEN CHARACTERIZATION FREQUENCY:	None		None		None
		QUALITY CONTROL MONITORING REQUIRED:	No		Yes		No
		FREQUENCY OF SAMPLING:	D	M	D	M	M
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED					
16	Volatiles, Halogenated (continued)	Carbon tetrachloride					
		Chlorobenzene					
		Chloroform					
		Chloromethane					
		Cis-1,3-Dichloropropylene					
		Dibromochloromethane					
		Ethylene dibromide					
		Methylene chloride					
		Tetrachloroethylene (Perchloroethylene)					
		Trans-1,2-Dichloroethylene					
		Trans-1,3-Dichloropropylene					
		Trichloroethylene					
		Trichlorofluoromethane					
		Vinyl chloride (Chloroethylene)					
17	Volatiles, Non-Halogenated	Benzene					●●●
		Styrene					
		Toluene					
		o-Xylene					
		m-Xylene and p-Xylene					
19	Extractables, Base Neutral	Acenaphthene					
		5-nitro Acenaphthene					
		Acenaphthylene					
		Anthracene					
		Benz(a)anthracene					
		Benzo(a)pyrene					●●●
		Benzo(b)fluoranthene					

SCHEDULE 1: ALGOMA STEEL

		NAME OF STREAM:	60" Sewer Outfall		30" Sewer Outfall		Cold Mill Storm Sewer Outfall
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	Yes		Yes		No
		CHARACTERIZATION FREQUENCY (except for ATGs 24 and 27):	Quarterly		Quarterly		None
		CHARACTERIZATION FREQUENCY FOR ATGs 24 and 27:	None		None		None
		OPEN CHARACTERIZATION FREQUENCY:	None		None		None
		QUALITY CONTROL MONITORING REQUIRED:	No		Yes		No
		FREQUENCY OF SAMPLING:	D	M	D	M	M
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED					
19	Extractables, Base Neutral (continued)	Benzo(g,h,i)perylene				**	
		Benzo(k)fluoranthene					
		Biphenyl					
		Camphene					
		1-Chloronaphthalene					
		2-Chloronaphthalene					
		Chrysene					
		Dibenz(a,h)anthracene					
		Fluoranthene					
		Fluorene					
		Indeno(1,2,3-cd)pyrene					
		Indole					
		1-Methylnaphthalene					
		2-Methylnaphthalene					
		Naphthalene					•••
		Perylene					
		Phenanthrene					
		Pyrene					
		Benzyl butyl phthalate					
		Bis(2-ethylhexyl) phthalate					
		Di-n-butyl phthalate					
		4-Bromophenyl phenyl ether					
		4-Chlorophenyl phenyl ether					
		Bis(2-chloroisopropyl)ether					
		Bis(2-chloroethyl)ether					
		Diphenyl ether					

SCHEDULE 1: ALGOMA STEEL

		NAME OF STREAM:	60" Sewer Outfall		30" Sewer Outfall		Cold Mill Storm Sewer Outfall
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	Yes		Yes		No
		CHARACTERIZATION FREQUENCY (except for AT6s 24 and 27):	Quarterly		Quarterly		None
		CHARACTERIZATION FREQUENCY FOR AT6s 24 and 27:	None		None		None
		OPEN CHARACTERIZATION FREQUENCY:	None		None		None
		QUALITY CONTROL MONITORING REQUIRED:	No		Yes		No
		FREQUENCY OF SAMPLING:	D	M	D	M	M
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED					
19	Extractables, Base Neutral (continued)	2,4-Dinitrotoluene					
		2,6-Dinitrotoluene					
		Bis(2-chloroethoxy)methane					
		Diphenylamine					
		N-Nitrosodiphenylamine					
		N-Nitrosodi-n-propylamine					
20	Extractables, Acid (Phenolics)	2,3,4,5-Tetrachlorophenol					
		2,3,4,6-Tetrachlorophenol					
		2,3,5,6-Tetrachlorophenol					
		2,3,4-Trichlorophenol					
		2,3,5-Trichlorophenol					
		2,4,5-Trichlorophenol					
		2,4,6-Trichlorophenol					
		2,4-Dimethyl phenol					
		2,4-Dinitrophenol					
		2,4-Dichlorophenol					
		2,6-Dichlorophenol					
		4,6-Dinitro-o-cresol					
		2-Chlorophenol					
		4-Chloro-3-methylphenol					
		4-Nitrophenol					
		m-Cresol					
		o-Cresol					
		p-Cresol					
		Pentachlorophenol					
		Phenol					

SCHEDULE 1: ALGOMA STEEL

		NAME OF STREAM:	60" Sewer Outfall		30" Sewer Outfall		Cold Mill Storm Sewer Outfall
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	Yes		Yes		No
		CHARACTERIZATION FREQUENCY (except for ATGs 24 and 27):	Quarterly		Quarterly		None
		CHARACTERIZATION FREQUENCY FOR ATGs 24 and 27:	None		None		None
		OPEN CHARACTERIZATION FREQUENCY:	None		None		None
		QUALITY CONTROL MONITORING REQUIRED:	No		Yes		No
		FREQUENCY OF SAMPLING:	D	M	D	M	M
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED					
23	Extractables, Neutral -Chlorinated	1,2,3,4-Tetrachlorobenzene					
		1,2,3,5-Tetrachlorobenzene					
		1,2,4,5-Tetrachlorobenzene					
		1,2,3-Trichlorobenzene					
		1,2,4-Trichlorobenzene					
		2,4,5-Trichlorotoluene					
		Hexachlorobenzene					
		Hexachlorobutadiene					
		Hexachlorocyclopentadiene					
		Hexachloroethane					
		Octachlorostyrene					
		Pentachlorobenzene					
25	Solvent Extractables	Oil and grease		•••		•••	•••
151	Iron	Iron		•••		•••	

* Daphnia Magna Acute Lethality Toxicity Test

SCHEDULE 2: ATLAS SPECIALTY STEEL

		NAME OF STREAM:	Waste Acid Solidification Plant	North Plant Treatment	CEVAM	42" Sewer				Waste Disposal Site	South Plant Water Reclaim
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	No	No	No	Yes				No	No
		CHARACTERIZATION FREQUENCY (except for ATEs 24 and 27):	None	None	None	Quarterly				None	None
		CHARACTERIZATION FREQUENCY FOR ATEs 24 and 27:	None	None	None	Semi-annually				None	None
		OPEN CHARACTERIZATION FREQUENCY:	None	None	None	Quarterly				None	None
		QUALITY CONTROL MONITORING REQUIRED:	No	Yes	No	Yes				No	No
		FREQUENCY OF SAMPLING:	W	TW	TW	D	TW	W	M	Event Orientated	Event Orientated
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED									
3	Hydrogen ion (pH)	Hydrogen ion (pH)	●●●	●●●	●●●	●●●					
5	Organic carbon (TOC/DOC)	Dissolved organic carbon (DOC)					●●●				
		Total organic carbon (TOC)									
6	Total phosphorus	Total phosphorus						●●●			
7	Specific conductance	Specific conductance				●●●					
8	Suspended solids (TSS/VSS)	Total suspended solids (TSS)	●●●	●●●	●●●	●●●				●●●	●●●
		Volatile suspended solids (VSS)	●●●	●●●	●●●	●●●				●●●	●●●
9	Total metals	Aluminum	●●●						●●●		
		Beryllium	●●●						●●●		
		Cadmium	●●●						●●●		
		Chromium	●●●	●●●	●●●				●●●		
		Cobalt	●●●						●●●		
		Copper	●●●						●●●		
		Lead	●●●						●●●		
		Molybdenum	●●●						●●●		
		Nickel	●●●	●●●	●●●				●●●	●●●	●●●
		Silver	●●●						●●●		
		Thallium	●●●						●●●		
		Vanadium	●●●						●●●		
		Zinc	●●●	●●●	●●●				●●●	●●●	●●●

SCHEDULE 2: ATLAS SPECIALTY STEEL

		NAME OF STREAM:	Waste Acid Solidification Plant	North Plant Treatment	CEVAM	42" Sewer				Waste Disposal Site	South Plant Water Reclaim
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	No	No	No	Yes				No	No
		CHARACTERIZATION FREQUENCY (except for ATGs 24 and 27):	None	None	None	Quarterly				None	None
		CHARACTERIZATION FREQUENCY FOR ATGs 24 and 27:	None	None	None	Semi-annually				None	None
		OPEN CHARACTERIZATION FREQUENCY:	None	None	None	Quarterly				None	None
		QUALITY CONTROL MONITORING REQUIRED:	No	Yes	No	Yes				No	No
		FREQUENCY OF SAMPLING:	W	TW	TW	D	TW	W	M	Event Orientated	Event Orientated
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED									
10	Hydrides	Antimony	●●●								
		Arsenic	●●●								
		Selenium	●●●								
11	Chromium (Hexavalent)	Chromium (Hexavalent)	●●●	●●●						●●●	
14	Phenolics (4AAP)	Phenolics (4AAP)									
16	Volatiles, Halogenated	1,1,2,2-Tetrachloroethane							●●●		
		1,1,2-Trichloroethane							●●●		
		1,1-Dichloroethane							●●●		
		1,1-Dichloroethylene							●●●		
		1,2-Dichlorobenzene							●●●		
		1,2-Dichloroethane (Ethylene dichloride)							●●●		
		1,2-Dichloropropane							●●●		
		1,3-Dichlorobenzene							●●●		
		1,4-Dichlorobenzene							●●●		
		Bromoform							●●●		
		Bromomethane							●●●		
		Carbon tetrachloride							●●●		
		Chlorobenzene							●●●		
		Chloroform							●●●		
		Chloromethane							●●●		
		Cis-1,3-Dichloropropylene							●●●		
		Dibromochloromethane							●●●		
		Ethylene dibromide							●●●		
		Methylene chloride							●●●		

SCHEDULE 2: ATLAS SPECIALTY STEEL

		NAME OF STREAM:	Waste Acid Solidification Plant	North Plant Treatment	CEVAM	42" Sewer				Waste Disposal Site	South Plant Water Reclaim
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	No	No	No	Yes				No	No
		CHARACTERIZATION FREQUENCY (except for ATGs 24 and 27):	None	None	None	Quarterly				None	None
		CHARACTERIZATION FREQUENCY FOR ATGs 24 and 27:	None	None	None	Semi-annually				None	None
		OPEN CHARACTERIZATION FREQUENCY:	None	None	None	Quarterly				None	None
		QUALITY CONTROL MONITORING REQUIRED:	No	Yes	No	Yes				No	No
		FREQUENCY OF SAMPLING:	W	TW	TW	D	TW	W	M	Event Orientated	Event Orientated
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED									
16	Volatiles, Halogenated (continued)	Tetrachloroethylene (Perchloroethylene)							•••		
		Trans-1,2-Dichloroethylene							•••		
		Trans-1,3-Dichloropropylene							•••		
		Trichloroethylene							•••		
		Trichlorofluoromethane							•••		
		Vinyl chloride (Chloroethylene)							•••		
19	Extractables, Base Neutral	Acenaphthene							•••		
		5-nitro Acenaphthene							•••		
		Acenaphthylene							•••		
		Anthracene							•••		
		Benz(a)anthracene							•••		
		Benzo(a)pyrene							•••		
		Benzo(b)fluoranthene							•••		
		Benzo(g,h,i)perylene							•••		
		Benzo(k)fluoranthene							•••		
		Biphenyl							•••		
		Camphene							•••		
		1-Chloronaphthalene							•••		
		2-Chloronaphthalene							•••		
		Chrysene							•••		
		Dibenz(a,h)anthracene							•••		
		Fluoranthene							•••		
		Fluorene							•••		
		Indeno(1,2,3-cd)pyrene							•••		
		Indole							•••		
		1-Methylnaphthalene							•••		

SCHEDULE 2: ATLAS SPECIALTY STEEL

		NAME OF STREAM:	Waste Acid Solidification Plant	North Plant Treatment	CEVAM	42" Sewer				Waste Disposal Site	South Plant Water Reclaim
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	No	No	No	Yes				No	No
		CHARACTERIZATION FREQUENCY (except for ATGs 24 and 27):	None	None	None	Quarterly				None	None
		CHARACTERIZATION FREQUENCY FOR ATGs 24 and 27:	None	None	None	Semi-annually				None	None
		OPEN CHARACTERIZATION FREQUENCY:	None	None	None	Quarterly				None	None
		QUALITY CONTROL MONITORING REQUIRED:	No	Yes	No	Yes				No	No
		FREQUENCY OF SAMPLING:	W	TW	TW	D	TW	W	M	Event Orientated	Event Orientated
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED									
19	Extractables, Base Neutral (continued)	2-Methylnaphthalene							•••		
		Naphthalene							•••		
		Perylene							•••		
		Phenanthrene							•••		
		Pyrene							•••		
		Benzyl butyl phthalate							•••		
		Bis(2-ethylhexyl) phthalate							•••		
		Di-n-butyl phthalate							•••		
		4-Bromophenyl phenyl ether							•••		
		4-Chlorophenyl phenyl ether							•••		
		Bis(2-chloroisopropyl)ether							•••		
		Bis(2-chloroethyl)ether							•••		
		Diphenyl ether							•••		
		2,4-Dinitrotoluene							•••		
		2,6-Dinitrotoluene							•••		
		Bis(2-chloroethoxy)methane							•••		
		Diphenylamine							•••		
		N-Nitrosodiphenylamine							•••		
		N-Nitrosodi-n-propylamine							•••		

SCHEDULE 2: ATLAS SPECIALTY STEEL

NAME OF STREAM:		Waste Acid Solidification Plant	North Plant Treatment	CEVAM	42" Sewer				Waste Disposal Site	South Plant Water Reclaim
FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:		No	No	No	Yes				No	No
CHARACTERIZATION FREQUENCY (except for ATGs 24 and 27):		None	None	None	Quarterly				None	None
CHARACTERIZATION FREQUENCY FOR ATGs 24 and 27:		None	None	None	Semi-annually				None	None
OPEN CHARACTERIZATION FREQUENCY:		None	None	None	Quarterly				None	None
QUALITY CONTROL MONITORING REQUIRED:		No	Yes	No	Yes				No	No
FREQUENCY OF SAMPLING:		W	TW	TW	D	TW	W	M	Event Orientated	Event Orientated
ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED									
23 Extractables, Neutral -Chlorinated	1,2,3,4-Tetrachlorobenzene							•••		
	1,2,3,5-Tetrachlorobenzene							•••		
	1,2,4,5-Tetrachlorobenzene							•••		
	1,2,3-Trichlorobenzene							•••		
	1,2,4-Trichlorobenzene							•••		
	2,4,5-Trichlorotoluene							•••		
	Hexachlorobenzene							•••		
	Hexachlorobutadiene							•••		
	Hexachlorocyclopentadiene							•••		
	Hexachloroethane							•••		
	Octachlorostyrene							•••		
	Pentachlorobenzene							•••		
25 Solvent Extractables	Oil and grease	•••	•••	•••	•••				•••	•••
51 Iron	Iron							•••		

* Daphnia Magna Acute Lethality Toxicity Test

SCHEDULE 2: ATLAS SPECIALTY STEEL

		NAME OF STREAM:	North Plant Water Reclaim at 42" Sewer	R & D
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	No	No
		CHARACTERIZATION FREQUENCY (except for ATGs 24 and 27):	None	None
		CHARACTERIZATION FREQUENCY FOR ATGs 24 and 27:	None	None
		OPEN CHARACTERIZATION FREQUENCY:	None	None
		QUALITY CONTROL MONITORING REQUIRED:	No	No
		FREQUENCY OF SAMPLING:	Event Orientated	M
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED		
3	Hydrogen ion (pH)	Hydrogen ion (pH)		
5	Organic carbon (TOC/DOC)	Dissolved organic carbon (DOC)		
		Total organic carbon (TOC)		
6	Total phosphorus	Total phosphorus		
7	Specific conductance	Specific conductance		
8	Suspended solids (TSS/VSS)	Total suspended solids (TSS)	•••	•••
		Volatile suspended solids (VSS)	•••	•••
9	Total metals	Aluminum		
		Beryllium		
		Cadmium		
		Chromium		
		Cobalt		
		Copper		
		Lead		
		Molybdenum		
		Nickel	•••	•••
		Silver		
		Thallium		
		Vanadium		
		Zinc	•••	•••

SCHEDULE 2: ATLAS SPECIALTY STEEL

		NAME OF STREAM:	North Plant Water Reclaim at 42" Sewer	R & D
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	No	No
		CHARACTERIZATION FREQUENCY (except for ATGs 24 and 27):	None	None
		CHARACTERIZATION FREQUENCY FOR ATGs 24 and 27:	None	None
		OPEN CHARACTERIZATION FREQUENCY:	None	None
		QUALITY CONTROL MONITORING REQUIRED:	No	No
		FREQUENCY OF SAMPLING:	Event Orientated	M
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED		
10	Hydrides	Antimony		
		Arsenic		
		Selenium		
11	Chromium (Hexavalent)	Chromium (Hexavalent)		
14	Phenolics (4AAP)	Phenolics (4AAP)		
16	Volatiles, Halogenated	1,1,2,2-Tetrachloroethane		
		1,1,2-Trichloroethane		
		1,1-Dichloroethane		
		1,1-Dichloroethylene		
		1,2-Dichlorobenzene		
		1,2-Dichloroethane (Ethylene dichloride)		
		1,2-Dichloropropane		
		1,3-Dichlorobenzene		
		1,4-Dichlorobenzene		
		Bromoform		
		Bromomethane		
		Carbon tetrachloride		
		Chlorobenzene		
		Chloroform		
		Chloromethane		
		Cis-1,3-Dichloropropylene		
		Dibromochloromethane		
		Ethylene dibromide		
		Methylene chloride		

SCHEDULE 2: ATLAS SPECIALTY STEEL

		NAME OF STREAM:	North Plant Water Reclaim at 42" Sewer	R & D
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	No	No
		CHARACTERIZATION FREQUENCY (except for ATGs 24 and 27):	None	None
		CHARACTERIZATION FREQUENCY FOR ATGs 24 and 27:	None	None
		OPEN CHARACTERIZATION FREQUENCY:	None	None
		QUALITY CONTROL MONITORING REQUIRED:	No	No
		FREQUENCY OF SAMPLING:	Event Orientated	M
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED		
16	Volatiles, Halogenated (continued)	Tetrachloroethylene (Perchloroethylene)		
		Trans-1,2-Dichloroethylene		
		Trans-1,3-Dichloropropylene		
		Trichloroethylene		
		Trichlorofluoromethane		
		Vinyl chloride (Chloroethylene)		
19	Extractables, Base Neutral	Acenaphthene		
		5-nitro Acenaphthene		
		Acenaphthylene		
		Anthracene		
		Benz(a)anthracene		
		Benzo(a)pyrene		
		Benzo(b)fluoranthene		
		Benzo(g,h,i)perylene		
		Benzo(k)fluoranthene		
		Biphenyl		
		Camphene		
		1-Chloronaphthalene		
		2-Chloronaphthalene		
		Chrysene		
		Dibenz(a,h)anthracene		
		Fluoranthene		
		Fluorene		
		Indeno(1,2,3-cd)pyrene		
		Indole		
		1-Methylnaphthalene		

SCHEDULE 2: ATLAS SPECIALTY STEEL

		NAME OF STREAM:	North Plant Water Reclaim at 42" Sewer	R & D
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	No	No
		CHARACTERIZATION FREQUENCY (except for ATGs 24 and 27):	None	None
		CHARACTERIZATION FREQUENCY FOR ATGs 24 and 27:	None	None
		OPEN CHARACTERIZATION FREQUENCY:	None	None
		QUALITY CONTROL MONITORING REQUIRED:	No	No
		FREQUENCY OF SAMPLING:	Event Orientated	M
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED		
19	Extractables, Base Neutral (continued)	2-Methylnaphthalene		
		Naphthalene		
		Perylene		
		Phenanthrene		
		Pyrene		
		Benzyl butyl phthalate		
		Bis(2-ethylhexyl) phthalate		
		Di-n-butyl phthalate		
		4-Bromophenyl phenyl ether	-	
		4-Chlorophenyl phenyl ether		
		Bis(2-chloroisopropyl)ether		
		Bis(2-chloroethyl)ether		
		Diphenyl ether		
		2,4-Dinitrotoluene		
		2,6-Dinitrotoluene		
		Bis(2-chloroethoxy)methane		
		Diphenylamine		
		N-Nitrosodiphenylamine		
		N-Nitrosodi-n-propylamine		

SCHEDULE 2: ATLAS SPECIALTY STEEL

		NAME OF STREAM:	North Plant Water Reclaim at 42" Sewer	R & D
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	No	No
		CHARACTERIZATION FREQUENCY (except for ATGs 24 and 27):	None	None
		CHARACTERIZATION FREQUENCY FOR ATGs 24 and 27:	None	None
		OPEN CHARACTERIZATION FREQUENCY:	None	None
		QUALITY CONTROL MONITORING REQUIRED:	No	No
		FREQUENCY OF SAMPLING:	Event Orientated	M
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED		
23	Extractables, Neutral -Chlorinated	1,2,3,4-Tetrachlorobenzene		
		1,2,3,5-Tetrachlorobenzene		
		1,2,4,5-Tetrachlorobenzene		
		1,2,3-Trichlorobenzene		
		1,2,4-Trichlorobenzene		
		2,4,5-Trichlorotoluene		
		Hexachlorobenzene		
		Hexachlorobutadiene		
		Hexachlorocyclopentadiene		
		Hexachloroethene		
		Octachlorostyrene		
		Pentachlorobenzene		
25	Solvent Extractables	Oil and grease	•••	•••
[S]	Iron	Iron		

* Daphnia Magna Acute Lethality Toxicity Test

SCHEDULE 3: DOFASCO

		NAME OF STREAM:	Coke Plant Biological Plant Discharge			Blast Furnace Recycle Blowdown	Steelmaking Clarifier Discharge	#1 Hot Mill Filtration Plant Discharge
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	No			No	No	No
		CHARACTERIZATION FREQUENCY (except for ATGs 24 and 27):	None			None	None	None
		CHARACTERIZATION FREQUENCY FOR ATGs 24 and 27:	None			None	None	None
		OPEN CHARACTERIZATION FREQUENCY:	None			None	None	None
		QUALITY CONTROL MONITORING REQUIRED:	Yes			No	No	No
		FREQUENCY OF SAMPLING:	TW	W	M	TW	TW	TW
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED						
2	Cyanide	Cyanide	•••			•••		
3	Hydrogen ion (pH)	Hydrogen ion (pH)						•••
4a	Nitrogen	Ammonia plus Ammonium	•••			•••		
		Total Kjeldahl nitrogen						
4b		Nitrate + Nitrite		•••			•••	•••
5	Organic carbon (TOC/DOC)	Dissolved organic carbon (DOC)						
		Total organic carbon (TOC)						
6	Total phosphorus	Total phosphorus		•••				
7	Specific conductance	Specific conductance					•••	•••
8	Suspended solids (TSS/VSS)	Total suspended solids (TSS)	•••			•••	•••	•••
		Volatile suspended solids (VSS)	•••			•••	•••	•••
9	Total metals	Aluminum						
		Beryllium						
		Cadmium						
		Chromium						
		Cobalt						
		Copper						
		Lead						
		Molybdenum					•••	•••

SCHEDULE 3: DOFASCO

NAME OF STREAM:			Coke Plant Biological Plant Discharge			Blast Furnace Recycle Blowdown	Steelmaking Clarifier Discharge	#1 Hot Mill Filtration Plant Discharge
FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:			No			No	No	No
CHARACTERIZATION FREQUENCY (except for ATGs 24 and 27):			None			None	None	None
CHARACTERIZATION FREQUENCY FOR ATGs 24 and 27:			None			None	None	None
OPEN CHARACTERIZATION FREQUENCY:			None			None	None	None
QUALITY CONTROL MONITORING REQUIRED:			Yes			No	No	No
FREQUENCY OF SAMPLING:			TW	W	M	TW	TW**	TW
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED						
9	Total metals (continued)	Nickel						
		Silver						
		Thallium						
		Vanadium						
		Zinc				•••	•••	•••
10	Hydrides	Antimony						
		Arsenic						
		Selenium						
12	Mercury	Mercury						
14	Phenolics (4AAP)	Phenolics (4AAP)	•••			•••		
16	Volatiles, Halogenated	1,1,2,2-Tetrachloroethane						
		1,1,2-Trichloroethane						
		1,1-Dichloroethane						
		1,1-Dichloroethylene						
		1,2-Dichlorobenzene						
		1,2-Dichloroethane (Ethylene dichloride)						
		1,2-Dichloropropane						
		1,3-Dichlorobenzene						
		1,4-Dichlorobenzene						
		Bromoform						
		Bromomethane						
		Carbon tetrachloride						
		Chlorobenzene						

SCHEDULE 3: DOFASCO

		NAME OF STREAM:	Coke Plant Biological Plant Discharge			Blast Furnace Recycle Blowdown	Steelmaking Clarifier Discharge	#1 Hot Mill Filtration Plant Discharge
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	No			No	No	No
		CHARACTERIZATION FREQUENCY (except for ATGs 24 and 27):	None			None	None	None
		CHARACTERIZATION FREQUENCY FOR ATGs 24 and 27:	None			None	None	None
		OPEN CHARACTERIZATION FREQUENCY:	None			None	None	None
		QUALITY CONTROL MONITORING REQUIRED:	Yes			No	No	No
		FREQUENCY OF SAMPLING:	TW	W	M	TW	TW	TW
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED						
16	Volatiles, Halogenated (continued)	Chloroform						
		Chloromethane						
		Cis-1,3-Dichloropropylene						
		Dibromochloromethane						
		Ethylene dibromide						
		Methylene chloride						
		Tetrachloroethylene (Perchloroethylene)						
		Trans-1,2-Dichloroethylene						
		Trans-1,3-Dichloropropylene						
		Trichloroethylene						
		Trichlorofluoromethane						
		Vinyl chloride (Chloroethylene)						
17	Volatiles, Non-Halogenated	Benzene	●●●					
		Styrene			●●●			
		Toluene			●●●			
		o-Xylene			●●●			
		m-Xylene and p-Xylene			●●●			
19	Extractables, Base Neutral	Acenaphthene			●●●			
		5-nitro Acenaphthene			●●●			
		Acenaphthylene			●●●			
		Anthracene			●●●			
		Benz(a)anthracene			●●●			
		Benzo(a)pyrene	●●●					
		Benzo(b)fluoranthene			●●●			
		Benzo(g,h,i)perylene			●●●			

SCHEDULE 3: DOFASCO

		NAME OF STREAM:	Coke Plant Biological Plant Discharge			Blast Furnace Recycle Blowdown	Steelmaking Clarifier Discharge	#1 Hot Mill Filtration Plant Discharge
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	No			No	No	No
		CHARACTERIZATION FREQUENCY (except for ATGs 24 and 27):	None			None	None	None
		CHARACTERIZATION FREQUENCY FOR ATGs 24 and 27:	None			None	None	None
		OPEN CHARACTERIZATION FREQUENCY:	None			None	None	None
		QUALITY CONTROL MONITORING REQUIRED:	Yes			No	No	No
		FREQUENCY OF SAMPLING:	TW	W	M	TW	TW	TW
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED						
19	Extractables, Base Neutral (continued)	Benzo(k)fluoranthene			•••			
		Biphenyl			•••			
		Camphene			•••			
		1-Chloronaphthalene			•••			
		2-Chloronaphthalene			•••			
		Chrysene			•••			
		Dibenz(a,h)anthracene			•••			
		Fluoranthene			•••			
		Fluorene			•••			
		Indeno(1,2,3-cd)pyrene			•••			
		Indole			•••			
		1-Methylnaphthalene			•••			
		2-Methylnaphthalene			•••			
		Naphthalene	•••					
		Perylene			•••			
		Phenanthrene			•••			
		Pyrene			•••			
		Benzyl butyl phthalate			•••			
		Bis(2-ethylhexyl) phthalate			•••			
		Di-n-butyl phthalate			•••			
		4-Bromophenyl phenyl ether			•••			
		4-Chlorophenyl phenyl ether			•••			
		Bis(2-chloroisopropyl)ether			•••			
		Bis(2-chloroethyl)ether			•••			
		Diphenyl ether			•••			

SCHEDULE 3: DOFASCO

NAME OF STREAM:		Coke Plant Biological Plant Discharge			Blast Furnace Recycle Blowdown	Steelmaking Clarifier Discharge	#1 Hot Mill Filtration Plant Discharge
FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:		No			No	No	No
CHARACTERIZATION FREQUENCY (except for ATGs 24 and 27):		None			None	None	None
CHARACTERIZATION FREQUENCY FOR ATGs 24 and 27:		None			None	None	None
OPEN CHARACTERIZATION FREQUENCY:		None			None	None	None
QUALITY CONTROL MONITORING REQUIRED:		Yes			No	No	No
FREQUENCY OF SAMPLING:		TW	W	M	TW	TW	TW
ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED						
19	Extractables, Base Neutral (continued)						
	2,4-Dinitrotoluene			•••			
	2,6-Dinitrotoluene			•••			
	Bis(2-chloroethoxy)methane			•••			
	Diphenylamine			•••			
	N-Nitrosodiphenylamine			•••			
	N-Nitrosodi-n-propylamine			•••			
20	Extractables, Acid (Phenolics)						
	2,3,4,5-Tetrachlorophenol						
	2,3,4,6-Tetrachlorophenol						
	2,3,5,6-Tetrachlorophenol						
	2,3,4-Trichlorophenol						
	2,3,5-Trichlorophenol						
	2,4,5-Trichlorophenol						
	2,4,6-Trichlorophenol						
	2,4-Dimethyl phenol						
	2,4-Dinitrophenol						
	2,4-Dichlorophenol						
	2,6-Dichlorophenol						
	4,6-Dinitro-o-cresol						
	2-Chlorophenol						
	4-Chloro-3-methylphenol						
	4-Nitrophenol						
	m-Cresol						
	o-Cresol						
	p-Cresol						
	Pentachlorophenol						
	Phenol						

SCHEDULE 3: DOFASCO

		NAME OF STREAM:	Coke Plant Biological Plant Discharge			Blast Furnace Recycle Blowdown	Steelmaking Clarifier Discharge	#1 Hot Mill Filtration Plant Discharge
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	No			No	No	No
		CHARACTERIZATION FREQUENCY (except for ATGs 24 and 27):	None			None	None	None
		CHARACTERIZATION FREQUENCY FOR ATGs 24 and 27:	None			None	None	None
		OPEN CHARACTERIZATION FREQUENCY:	None			None	None	None
		QUALITY CONTROL MONITORING REQUIRED:	Yes			No	No	No
		FREQUENCY OF SAMPLING:	TW	W	M	TW	TW	TW
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED						
23	Extractables, Neutral -Chlorinated	1,2,3,4-Tetrachlorobenzene						
		1,2,3,5-Tetrachlorobenzene						
		1,2,4,5-Tetrachlorobenzene						
		1,2,3-Trichlorobenzene						
		1,2,4-Trichlorobenzene						
		2,4,5-Trichlorotoluene						
		Hexachlorobenzene						
		Hexachlorobutadiene						
		Hexachlorocyclopentadiene						
		Hexachloroethane						
		Octachlorostyrene						
		Pentachlorobenzene						
25	Solvent Extractables	Oil and grease	•••				•••	•••
31	Iron	Iron						

* Daphnia Magna Acute Lethality Toxicity Test

SCHEDULE 3: DOFASCO

		NAME OF STREAM:	Cold Mill Treatment Plant Discharge	Ottawa Sewer				West Bayfront Sewer				East Boat Slip Sewer			
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	No	Yes				Yes				Yes			
		CHARACTERIZATION FREQUENCY (except for ATGs 24 and 27):	None	Quarterly				Quarterly				Quarterly			
		CHARACTERIZATION FREQUENCY FOR ATGs 24 and 27:	None	Semi-annually				Semi-annually				Semi-annually			
		OPEN CHARACTERIZATION FREQUENCY:	None	Quarterly				Quarterly				Quarterly			
		QUALITY CONTROL MONITORING REQUIRED:	No	No				Yes				Yes			
		FREQUENCY OF SAMPLING:	TW	D	TW	W	M	D	TW	W	M	D	TW	W	M
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED													
2	Cyanide	Cyanide				●●●				●●●				●●●	
3	Hydrogen ion (pH)	Hydrogen ion (pH)	●●●	●●●				●●●				●●●			
4a	Nitrogen	Ammonia plus Ammonium				●●●				●●●				●●●	
		Total Kjeldahl nitrogen													
4b		Nitrate + Nitrite													
5	Organic carbon (TOC/DOC)	Dissolved organic carbon (DOC)	●●●		●●●				●●●				●●●		
		Total organic carbon (TOC)													
6	Total phosphorus	Total phosphorus				●●●				●●●				●●●	
7	Specific conductance	Specific conductance		●●●				●●●				●●●			
8	Suspended solids (TSS/VSS)	Total suspended solids (TSS)	●●●	●●●				●●●				●●●			
		Volatile suspended solids (VSS)	●●●	●●●				●●●				●●●			
9	Total metals	Aluminum													
		Beryllium					●●●				●●●				●●●
		Cadmium					●●●				●●●				●●●
		Chromium					●●●				●●●				●●●
		Cobalt	●●●			●●●				●●●				●●●	
		Copper					●●●				●●●				●●●
		Lead					●●●				●●●				●●●
		Molybdenum	●●●				●●●				●●●				●●●
							●●●				●●●				●●●

SCHEDULE 3: DOFASCO

		NAME OF STREAM:	Cold Mill Treatment Plant Discharge	Ottawa Sewer				West Bayfront Sewer				East Boat Slip Sewer			
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	No	Yes				Yes				Yes			
		CHARACTERIZATION FREQUENCY (except for ATGs 24 and 27):	None	Quarterly				Quarterly				Quarterly			
		CHARACTERIZATION FREQUENCY FOR ATGs 24 and 27:	None	Semi-annually				Semi-annually				Semi-annually			
		OPEN CHARACTERIZATION FREQUENCY:	None	Quarterly				Quarterly				Quarterly			
		QUALITY CONTROL MONITORING REQUIRED:	No	No				Yes				Yes			
		FREQUENCY OF SAMPLING:	TW	D	TW	W	M	D	TW	W	M	D	TW	W	M
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED													
9	Total metals (continued)	Nickel					●●●				●●●				●●●
		Silver					●●●				●●●				●●●
		Thallium					●●●				●●●				●●●
		Vanadium					●●●				●●●				●●●
		Zinc	●●●				●●●			●●●				●●●	
10	Hydrides	Antimony									●●●				●●●
		Arsenic									●●●				●●●
		Selenium									●●●				●●●
12	Mercury	Mercury									●●●				●●●
14	Phenolics (4AAP)	Phenolics (4AAP)				●●●				●●●				●●●	
16	Volatiles, Halogenated	1,1,2,2-Tetrachloroethane					●●●				●●●				●●●
		1,1,2-Trichloroethane					●●●				●●●				●●●
		1,1-Dichloroethane					●●●				●●●				●●●
		1,1-Dichloroethylene					●●●				●●●				●●●
		1,2-Dichlorobenzene					●●●				●●●				●●●
		1,2-Dichloroethane (Ethylene dichloride)					●●●				●●●				●●●
		1,2-Dichloropropane					●●●				●●●				●●●
		1,3-Dichlorobenzene					●●●				●●●				●●●
		1,4-Dichlorobenzene					●●●				●●●				●●●
		Bromoform					●●●				●●●				●●●
		Bromomethane					●●●				●●●				●●●
		Carbon tetrachloride					●●●				●●●				●●●
		Chlorobenzene					●●●				●●●				●●●

SCHEDULE 3: DOFASCO

		NAME OF STREAM:	Cold Mill Treatment Plant Discharge	Ottawa Sewer				West Bayfront Sewer				East Boat Slip Sewer			
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	No	Yes				Yes				Yes			
		CHARACTERIZATION FREQUENCY (except for ATGs 24 and 27):	None	Quarterly				Quarterly				Quarterly			
		CHARACTERIZATION FREQUENCY FOR ATGs 24 and 27:	None	Semi-annually				Semi-annually				Semi-annually			
		OPEN CHARACTERIZATION FREQUENCY:	None	Quarterly				Quarterly				Quarterly			
		QUALITY CONTROL MONITORING REQUIRED:	No	No				Yes				Yes			
		FREQUENCY OF SAMPLING:	TW	D	TW	W	M	D	TW	W	M	D	TW	W	M
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED													
16	Volatiles, Halogenated (continued)	Chloroform					●●●				●●●				●●●
		Chloromethane					●●●				●●●				●●●
		Cis-1,3-Dichloropropylene					●●●				●●●				●●●
		Dibromochloromethane					●●●				●●●				●●●
		Ethylene dibromide					●●●				●●●				●●●
		Methylene chloride					●●●				●●●				●●●
		Tetrachloroethylene (Perchloroethylene)					●●●				●●●				●●●
		Trans-1,2-Dichloroethylene					●●●				●●●				●●●
		Trans-1,3-Dichloropropylene					●●●				●●●				●●●
		Trichloroethylene					●●●				●●●				●●●
		Trichlorofluoromethane					●●●				●●●				●●●
		Vinyl chloride (Chloroethylene)					●●●				●●●				●●●
17	Volatiles, Non-Halogenated	Benzene									●●●				●●●
		Styrene									●●●				●●●
		Toluene									●●●				●●●
		o-Xylene									●●●				●●●
		m-Xylene and p-Xylene									●●●				●●●
19	Extractables, Base Neutral	Acenaphthene					●●●				●●●				●●●
		5-nitro Acenaphthene					●●●				●●●				●●●
		Acenaphthylene					●●●				●●●				●●●
		Anthracene					●●●				●●●				●●●
		Benz(a)anthracene					●●●				●●●				●●●
		Benzo(a)pyrene					●●●				●●●				●●●
		Benzo(b)fluoranthene					●●●				●●●				●●●
		Benzo(g,h,i)perylene					●●●				●●●				●●●

SCHEDULE 3: DOFASCO

		NAME OF STREAM:	Cold Mill Treatment Plant Discharge	Ottawa Sewer				West Bayfront Sewer				East Boat Slip Sewer			
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	No	Yes				Yes				Yes			
		CHARACTERIZATION FREQUENCY (except for AT6s 24 and 27):	None	Quarterly				Quarterly				Quarterly			
		CHARACTERIZATION FREQUENCY FOR AT6s 24 and 27:	None	Semi-annually				Semi-annually				Semi-annually			
		OPEN CHARACTERIZATION FREQUENCY:	None	Quarterly				Quarterly				Quarterly			
		QUALITY CONTROL MONITORING REQUIRED:	No	No				Yes				Yes			
		FREQUENCY OF SAMPLING:	TW	D	TW	W	M	D	TW	W	M	D	TW	W	M
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED													
19	Extractables, Base Neutral (continued)	Benzo(k)fluoranthene					●●●				●●●				●●●
		Biphenyl					●●●				●●●				●●●
		Camphene					●●●				●●●				●●●
		1-Chloronaphthalene					●●●				●●●				●●●
		2-Chloronaphthalene					●●●				●●●				●●●
		Chrysene					●●●				●●●				●●●
		Dibenz(a,h)anthracene					●●●				●●●				●●●
		Fluoranthene					●●●				●●●				●●●
		Fluorene					●●●				●●●				●●●
		Indeno(1,2,3-cd)pyrene					●●●				●●●				●●●
		Indole					●●●				●●●				●●●
		1-Methylnaphthalene					●●●				●●●				●●●
		2-Methylnaphthalene					●●●				●●●				●●●
		Naphthalene					●●●				●●●				●●●
		Perylene					●●●				●●●				●●●
		Phenanthrene					●●●				●●●				●●●
		Pyrene					●●●				●●●				●●●
		Benzyl butyl phthalate					●●●				●●●				●●●
		Bis(2-ethylhexyl) phthalate					●●●				●●●				●●●
		Di-n-butyl phthalate					●●●				●●●				●●●
		4-Bromophenyl phenyl ether					●●●				●●●				●●●
		4-Chlorophenyl phenyl ether					●●●				●●●				●●●
		Bis(2-chloroisopropyl)ether					●●●				●●●				●●●
		Bis(2-chloroethyl)ether					●●●				●●●				●●●
		Diphenyl ether					●●●				●●●				●●●

SCHEDULE 3: DOFASCO

		NAME OF STREAM:	Cold Mill Treatment Plant Discharge	Ottawa Sewer				West Bayfront Sewer				East Boat Slip Sewer			
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	No	Yes				Yes				Yes			
		CHARACTERIZATION FREQUENCY (except for ATGs 24 and 27):	None	Quarterly				Quarterly				Quarterly			
		CHARACTERIZATION FREQUENCY FOR ATGs 24 and 27:	None	Semi-annually				Semi-annually				Semi-annually			
		OPEN CHARACTERIZATION FREQUENCY:	None	Quarterly				Quarterly				Quarterly			
		QUALITY CONTROL MONITORING REQUIRED:	No	No				Yes				Yes			
		FREQUENCY OF SAMPLING:	TW	D	TW	W	M	D	TW	W	M	D	TW	W	M
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED													
19	Extractables, Base Neutral (continued)	2,4-Dinitrotoluene					●●●				●●●				●●●
		2,6-Dinitrotoluene					●●●				●●●				●●●
		Bis(2-chloroethoxy)methane					●●●				●●●				●●●
		Diphenylamine					●●●				●●●				●●●
		N-Nitrosodiphenylamine					●●●				●●●				●●●
		N-Nitrosodi-n-propylamine					●●●				●●●				●●●
20	Extractables, Acid (Phenolics)	2,3,4,5-Tetrachlorophenol									●●●				●●●
		2,3,4,6-Tetrachlorophenol									●●●				●●●
		2,3,5,6-Tetrachlorophenol									●●●				●●●
		2,3,4-Trichlorophenol									●●●				●●●
		2,3,5-Trichlorophenol									●●●				●●●
		2,4,5-Trichlorophenol									●●●				●●●
		2,4,6-Trichlorophenol									●●●				●●●
		2,4-Dimethyl phenol									●●●				●●●
		2,4-Dinitrophenol									●●●				●●●
		2,4-Dichlorophenol									●●●				●●●
		2,6-Dichlorophenol									●●●				●●●
		4,6-Dinitro-o-cresol									●●●				●●●
		2-Chlorophenol									●●●				●●●
		4-Chloro-3-methylphenol									●●●				●●●
		4-Nitrophenol									●●●				●●●
		m-Cresol									●●●				●●●
		o-Cresol									●●●				●●●
		p-Cresol									●●●				●●●
		Pentachlorophenol									●●●				●●●
		Phenol									●●●				●●●

SCHEDULE 3: DOFASCO

		NAME OF STREAM:	Cold Mill Treatment Plant Discharge	Ottawa Sewer				West Bayfront Sewer				East Boat Slip Sewer			
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	No	Yes				Yes				Yes			
		CHARACTERIZATION FREQUENCY (except for ATGs 24 and 27):	None	Quarterly				Quarterly				Quarterly			
		CHARACTERIZATION FREQUENCY FOR ATGs 24 and 27:	None	Semi-annually				Semi-annually				Semi-annually			
		OPEN CHARACTERIZATION FREQUENCY:	None	Quarterly				Quarterly				Quarterly			
		QUALITY CONTROL MONITORING REQUIRED:	No	No				Yes				Yes			
		FREQUENCY OF SAMPLING:	TW	D	TW	W	M	D	TW	W	M	D	TW	W	M
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED													
23	Extractables, Neutral -Chlorinated	1,2,3,4-Tetrachlorobenzene					●●●				●●●				●●●
		1,2,3,5-Tetrachlorobenzene					●●●				●●●				●●●
		1,2,4,5-Tetrachlorobenzene					●●●				●●●				●●●
		1,2,3-Trichlorobenzene					●●●				●●●				●●●
		1,2,4-Trichlorobenzene					●●●				●●●				●●●
		2,4,5-Trichlorotoluene					●●●				●●●				●●●
		Hexachlorobenzene					●●●				●●●				●●●
		Hexachlorobutadiene					●●●				●●●				●●●
		Hexachlorocyclopentadiene					●●●				●●●				●●●
		Hexachloroethane					●●●				●●●				●●●
		Octachlorostyrene					●●●				●●●				●●●
		Pentachlorobenzene													
25	Solvent Extractables	Oil and grease	●●●	●●●				●●●				●●●			
151	Iron	Iron				●●●				●●●				●●●	

* Daphnia Magna Acute Lethality Toxicity Test

SCHEDULE 3: DOFASCO

		NAME OF STREAM:	Boilerhouse Sewer #1		Boilerhouse Sewer #2	Southeast Coal Fields Storm Sewer	Kenilworth Plant Storm Sewer
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	Yes		Yes	No	No
		CHARACTERIZATION FREQUENCY (except for ATGs 24 and 27):	Quarterly		Quarterly	None	None
		CHARACTERIZATION FREQUENCY FOR ATGs 24 and 27:	None		None	None	None
		OPEN CHARACTERIZATION FREQUENCY:	None		None	None	None
		QUALITY CONTROL MONITORING REQUIRED:	Yes		No	No	No
		FREQUENCY OF SAMPLING:	W	M	M	Event Orientated	M
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED					
2	Cyanide	Cyanide	●●●		●●●	●●●	●●●
3	Hydrogen ion (pH)	Hydrogen ion (pH)					
4a	Nitrogen	Ammonia plus Ammonium	●●●		●●●	●●●	●●●
		Total Kjeldahl nitrogen					
4b		Nitrate + Nitrite					
5	Organic carbon (TOC/DOC)	Dissolved organic carbon (DOC)		●●●	●●●		
		Total organic carbon (TOC)					
6	Total phosphorus	Total phosphorus	●●●		●●●		
7	Specific conductance	Specific conductance					
8	Suspended solids (TSS/VSS)	Total suspended solids (TSS)		●●●	●●●	●●●	●●●
		Volatile suspended solids (VSS)		●●●	●●●	●●●	●●●
9	Total metals	Aluminum					
		Beryllium					
		Cadmium					
		Chromium	●●●			●●●	●●●
		Cobalt					
		Copper					
		Lead		●●●	●●●	●●●	●●●
		Molybdenum					

SCHEDULE 3: DOFASCO

		NAME OF STREAM:	Boilerhouse Sewer #1		Boilerhouse Sewer #2	Southeast Coal Fields Storm Sewer	Kenilworth Plant Storm Sewer
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	Yes		Yes	No	No
		CHARACTERIZATION FREQUENCY (except for ATGs 24 and 27):	Quarterly		Quarterly	None	None
		CHARACTERIZATION FREQUENCY FOR ATGs 24 and 27:	None		None	None	None
		OPEN CHARACTERIZATION FREQUENCY:	None		None	None	None
		QUALITY CONTROL MONITORING REQUIRED:	Yes		No	No	No
		FREQUENCY OF SAMPLING:	W	M	M	Event Orientated	M
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED					
9	Total metals (continued)	Nickel					
		Silver					
		Thallium					
		Vanadium					
		Zinc	●●●		●●●	●●●	●●●
10	Hydrides	Antimony					
		Arsenic					
		Selenium					
12	Mercury	Mercury					
14	Phenolics (4AAP)	Phenolics (4AAP)	●●●		●●●	●●●	●●●
16	Volatiles, Halogenated	1,1,2,2-Tetrachloroethane					
		1,1,2-Trichloroethane					
		1,1-Dichloroethane					
		1,1-Dichloroethylene					
		1,2-Dichlorobenzene					
		1,2-Dichloroethane (Ethylene dichloride)					
		1,2-Dichloropropane					
		1,3-Dichlorobenzene					
		1,4-Dichlorobenzene					
		Bromoform					
		Bromomethane					
		Carbon tetrachloride					
		Chlorobenzene					

SCHEDULE 3: DOFASCO

		NAME OF STREAM:	Boilerhouse Sewer #1		Boilerhouse Sewer #2	Southeast Coal Fields Storm Sewer	Kenilworth Plant Storm Sewer
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	Yes		Yes	No	No
		CHARACTERIZATION FREQUENCY (except for ATGs 24 and 27):	Quarterly		Quarterly	None	None
		CHARACTERIZATION FREQUENCY FOR ATGs 24 and 27:	None		None	None	None
		OPEN CHARACTERIZATION FREQUENCY:	None		None	None	None
		QUALITY CONTROL MONITORING REQUIRED:	Yes		No	No	No
		FREQUENCY OF SAMPLING:	W	M	M	Event Orientated	M
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED					
16	Volatiles, Halogenated (continued)	Chloroform					
		Chloromethane					
		Cis-1,3-Dichloropropylene					
		Dibromochloromethane					
		Ethylene dibromide					
		Methylene chloride					
		Tetrachloroethylene (Perchloroethylene)					
		Trans-1,2-Dichloroethylene					
		Trans-1,3-Dichloropropylene					
		Trichloroethylene					
		Trichlorofluoromethane					
		Vinyl chloride (Chloroethylene)					
17	Volatiles, Non-Halogenated	Benzene					
		Styrene				•••	•••
		Toluene					
		o-Xylene					
		m-Xylene and p-Xylene					
19	Extractables, Base Neutral	Acenaphthene					
		5-nitro Acenaphthene					
		Acenaphthylene					
		Anthracene					
		Benz(a)anthracene					
		Benzo(a)pyrene				•••	•••
		Benzo(b)fluoranthene					
		Benzo(g,h,i)perylene					

SCHEDULE 3: DOFASCO

NAME OF STREAM:		Boilerhouse Sewer #1		Boilerhouse Sewer #2	Southeast Coal Fields Storm Sewer	Kenilworth Plant Storm Sewer
FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:		Yes		Yes	No	No
CHARACTERIZATION FREQUENCY (except for ATGs 24 and 27):		Quarterly		Quarterly	None	None
CHARACTERIZATION FREQUENCY FOR ATGs 24 and 27:		None		None	None	None
OPEN CHARACTERIZATION FREQUENCY:		None		None	None	None
QUALITY CONTROL MONITORING REQUIRED:		Yes		No	No	No
FREQUENCY OF SAMPLING:		W	M	M	Event Orientated	M
ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED					
19 Extractables, Base Neutral (continued)	Benzo(k)fluoranthene					
	Biphenyl					
	Camphene					
	1-Chloronaphthalene					
	2-Chloronaphthalene					
	Chrysene					
	Dibenz(a,h)anthracene					
	Fluoranthene					
	Fluorene				**	
	Indeno(1,2,3-cd)pyrene					
	Indole					
	1-Methylnaphthalene					
	2-Methylnaphthalene					
	Naphthalene				•••	•••
	Perylene					
	Phenanthrene					
	Pyrene					
	Benzyl butyl phthalate					
	Bis(2-ethylhexyl) phthalate					
	Di-n-butyl phthalate					
	4-Bromophenyl phenyl ether					
	4-Chlorophenyl phenyl ether					
	Bis(2-chloroisopropyl)ether					
	Bis(2-chloroethyl)ether					
	Diphenyl ether					

SCHEDULE 3: DOFASCO

		NAME OF STREAM:	Boilerhouse Sewer #1		Boilerhouse Sewer #2	Southeast Coal Fields Storm Sewer	Kenilworth Plant Storm Sewer
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	Yes		Yes	No	No
		CHARACTERIZATION FREQUENCY (except for ATGs 24 and 27):	Quarterly		Quarterly	None	None
		CHARACTERIZATION FREQUENCY FOR ATGs 24 and 27:	None		None	None	None
		OPEN CHARACTERIZATION FREQUENCY:	None		None	None	None
		QUALITY CONTROL MONITORING REQUIRED:	Yes		No	No	No
		FREQUENCY OF SAMPLING:	W	M	M	Event Orientated	M
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED					
19	Extractables, Base Neutral (continued)	2,4-Dinitrotoluene					
		2,6-Dinitrotoluene					
		Bis(2-chloroethoxy)methane					
		Diphenylamine					
		N-Nitrosodiphenylamine					
		N-Nitrosodi-n-propylamine					
20	Extractables, Acid (Phenolics)	2,3,4,5-Tetrachlorophenol					
		2,3,4,6-Tetrachlorophenol					
		2,3,5,6-Tetrachlorophenol					
		2,3,4-Trichlorophenol					
		2,3,5-Trichlorophenol					
		2,4,5-Trichlorophenol					
		2,4,6-Trichlorophenol					
		2,4-Dimethyl phenol					
		2,4-Dinitrophenol					
		2,4-Dichlorophenol					
		2,6-Dichlorophenol					
		4,6-Dinitro-o-cresol					
		2-Chlorophenol					
		4-Chloro-3-methylphenol					
		4-Nitrophenol					
		m-Cresol					
		o-Cresol					
		p-Cresol					
		Pentachlorophenol					
		Phenol					

SCHEDULE 3: DOFASCO

NAME OF STREAM:			Boilerhouse Sewer #1		Boilerhouse Sewer #2	Southeast Coal Fields Storm Sewer	Kenilworth Plant Storm Sewer
FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:			Yes		Yes	No	No
CHARACTERIZATION FREQUENCY (except for ATGs 24 and 27):			Quarterly		Quarterly	None	None
CHARACTERIZATION FREQUENCY FOR ATGs 24 and 27:			None		None	None	None
OPEN CHARACTERIZATION FREQUENCY:			None		None	None	None
QUALITY CONTROL MONITORING REQUIRED:			Yes		No	No	No
FREQUENCY OF SAMPLING:			W	M	M	Event Orientated	M
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED					
23	Extractables, Neutral -Chlorinated	1,2,3,4-Tetrachlorobenzene					
		1,2,3,5-Tetrachlorobenzene					
		1,2,4,5-Tetrachlorobenzene					
		1,2,3-Trichlorobenzene					
		1,2,4-Trichlorobenzene					
		2,4,5-Trichlorotoluene					
		Hexachlorobenzene					
		Hexachlorobutadiene					
		Hexachlorocyclopentadiene					
		Hexachloroethane					
		Octachlorostyrene					
		Pentachlorobenzene					
25	Solvent Extractables	Oil and grease		•••	•••	•••	•••
151	Iron	Iron	•••		•••		

* Daphnia Magna Acute Lethality Toxicity Test

SCHEDULE 4: IVACO ROLLING MILLS

		NAME OF STREAM:	East Discharge	North-East Discharge	Mill Pond Outlet	East Discharge
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	Yes	No	No	Yes
		CHARACTERIZATION FREQUENCY (except for ATGs 24 and 27):	Quarterly	None	None	None
		CHARACTERIZATION FREQUENCY FOR ATGs 24 and 27:	None	None	None	Event Orientated
		OPEN CHARACTERIZATION FREQUENCY:	None	None	None	Event Orientated
		QUALITY CONTROL MONITORING REQUIRED:	Yes	No	Yes	Yes
		FREQUENCY OF SAMPLING:	M	M	Event Orientated	Event Orientated
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED				
3	Hydrogen ion (pH)	Hydrogen ion (pH)			●●●	●●●
5	Organic carbon (TOC/DOC)	Dissolved organic carbon (DOC)	●●●			
		Total organic carbon (TOC)				
6	Total phosphorus	Total phosphorus	●●●			
7	Specific conductance	Specific conductance				●●●
8	Suspended solids (TSS/VSS)	Total suspended solids (TSS)	●●●	●●●	●●●	●●●
		Volatile suspended solids (VSS)	●●●	●●●	●●●	●●●
9	Total metals	Aluminum				
		Beryllium				
		Cadmium				
		Chromium				
		Cobalt				
		Copper				
		Lead	●●●	●●●	●●●	●●●
		Molybdenum				
		Nickel				
		Silver				
		Thallium				
		Vanadium				
		Zinc	●●●	●●●	●●●	●●●

SCHEDULE 4: IVACO ROLLING MILLS

		NAME OF STREAM:	East Discharge	North-East Discharge	Mill Pond Outlet	East Discharge
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	Yes	No	No	Yes
		CHARACTERIZATION FREQUENCY (except for ATGs 24 and 27):	Quarterly	None	None	None
		CHARACTERIZATION FREQUENCY FOR ATGs 24 and 27:	None	None	None	Event Orientated
		OPEN CHARACTERIZATION FREQUENCY:	None	None	None	Event Orientated
		QUALITY CONTROL MONITORING REQUIRED:	Yes	No	Yes	Yes
		FREQUENCY OF SAMPLING:	M	M	Event Orientated	Event Orientated
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED				
25	Solvent Extractables	Oil and grease	•••	•••	•••	•••
IS1	Iron	Iron	•••			

* Daphnia Magna Acute Lethality Toxicity Test

SCHEDULE 5: LAKE ONTARIO STEEL DIVISION OF CO - STEEL INC.

		NAME OF STREAM:	South Pond				Storm Water Discharge Point	Waste Disposal Site
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	Yes				No	No
		CHARACTERIZATION FREQUENCY (except for ATGs 24 and 27):	Quarterly				None	None
		CHARACTERIZATION FREQUENCY FOR ATGs 24 and 27:	Semi-annually				None	None
		OPEN CHARACTERIZATION FREQUENCY:	Quarterly				None	None
		QUALITY CONTROL MONITORING REQUIRED:	Yes				No	No
		FREQUENCY OF SAMPLING:	D	TW	W	M	M	Event Orientated
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED						
3	Hydrogen ion (pH)	Hydrogen ion (pH)	●●●					
5	Organic carbon (TOC/DOC)	Dissolved organic carbon (DOC)			●●●			
		Total organic carbon (TOC)						
6	Total phosphorus	Total phosphorus			●●●			
7	Specific conductance	Specific conductance	●●●					
8	Suspended solids (TSS/VSS)	Total suspended solids (TSS)	●●●				●●●	●●●
		Volatile suspended solids (VSS)	●●●				●●●	●●●
9	Total metals	Aluminum				●●●		
		Beryllium				●●●		
		Cadmium				●●●		
		Chromium				●●●		
		Cobalt				●●●		
		Copper				●●●		
		Lead		●●●			●●●	●●●
		Molybdenum				●●●		
		Nickel				●●●		
		Silver				●●●		
		Thallium				●●●		
		Vanadium				●●●		
		Zinc		●●●			●●●	●●●

SCHEDULE 5: LAKE ONTARIO STEEL DIVISION OF CO - STEEL INC.

		NAME OF STREAM:	South Pond				Storm Water Discharge Point	Waste Disposal Site
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	Yes				No	No
		CHARACTERIZATION FREQUENCY (except for ATGs 24 and 27):	Quarterly				None	None
		CHARACTERIZATION FREQUENCY FOR ATGs 24 and 27:	Semi-annually				None	None
		OPEN CHARACTERIZATION FREQUENCY:	Quarterly				None	None
		QUALITY CONTROL MONITORING REQUIRED:	Yes				No	No
		FREQUENCY OF SAMPLING:	D	TW	W	M	M	Event Orientated
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED						
16	Volatiles, Halogenated	1,1,2,2-Tetrachloroethane				•••		
		1,1,2-Trichloroethane				•••		
		1,1-Dichloroethane				•••		
		1,1-Dichloroethylene				•••		
		1,2-Dichlorobenzene				•••		
		1,2-Dichloroethane (Ethylene dichloride)				•••		
		1,2-Dichloropropane				•••		
		1,3-Dichlorobenzene				•••		
		1,4-Dichlorobenzene				•••		
		Bromoform				•••		
		Bromomethane				•••		
		Carbon tetrachloride				•••		
		Chlorobenzene				•••		
		Chloroform				•••		
		Chloromethane				•••		
		Cis-1,3-Dichloropropylene				•••		
		Dibromochloromethane				•••		
		Ethylene dibromide				•••		
		Methylene chloride				•••		
		Tetrachloroethylene (Perchloroethylene)				•••		
		Trans-1,2-Dichloroethylene				•••		
		Trans-1,3-Dichloropropylene				•••		
		Trichloroethylene				•••		
		Trichlorofluoromethane				•••		
		Vinyl chloride (Chloroethylene)				•••		

SCHEDULE 5: LAKE ONTARIO STEEL DIVISION OF CO - STEEL INC.

		NAME OF STREAM:	South Pond				Storm Water Discharge Point	Waste Disposal Site
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	Yes				No	No
		CHARACTERIZATION FREQUENCY (except for ATGs 24 and 27):	Quarterly				None	None
		CHARACTERIZATION FREQUENCY FOR ATGs 24 and 27:	Semi-annually				None	None
		OPEN CHARACTERIZATION FREQUENCY:	Quarterly				None	None
		QUALITY CONTROL MONITORING REQUIRED:	Yes				No	No
		FREQUENCY OF SAMPLING:	D	TW	W	M	M	Event Orientated
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED						
19	Extractables, Base Neutral	Acenephthene				●●●		
		5-nitro Acenephthene				●●●		
		Acenaphthylene				●●●		
		Anthracene				●●●		
		Benz(a)anthracene				●●●		
		Benzo(a)pyrene				●●●		
		Benzo(b)fluoranthene				●●●		
		Benzo(g,h,i)perylene				●●●		
		Benzo(k)fluoranthene				●●●		
		Biphenyl				●●●		
		Camphene				●●●		
		1-Chloronaphthalene				●●●		
		2-Chloronaphthalene				●●●		
		Chrysene				●●●		
		Dibenz(a,h)anthracene				●●●		
		Fluoranthene				●●●		
		Fluorene				●●●		
		Indeno(1,2,3-cd)pyrene				●●●		
		Indole				●●●		
		1-Methylnaphthalene				●●●		
		2-Methylnaphthalene				●●●		
		Naphthalene				●●●		
		Perylene				●●●		
		Phenanthrene				●●●		
		Pyrene				●●●		
		Benzyl butyl phthalate				●●●		
		Bis(2-ethylhexyl) phthalate				●●●		
		Di-n-butyl phthalate				●●●		

SCHEDULE 5: LAKE ONTARIO STEEL DIVISION OF CO - STEEL INC

		NAME OF STREAM:	South Pond				Storm Water Discharge Point	Waste Disposal Site
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	Yes				No	No
		CHARACTERIZATION FREQUENCY (except for ATGs 24 and 27):	Quarterly				None	None
		CHARACTERIZATION FREQUENCY FOR ATGs 24 and 27:	Semi-annually				None	None
		OPEN CHARACTERIZATION FREQUENCY:	Quarterly				None	None
		QUALITY CONTROL MONITORING REQUIRED:	Yes				No	No
		FREQUENCY OF SAMPLING:	D	TW	W	M	M	Event Orientated
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED						
19	Extractables, Base Neutral (continued)	4-Bromophenyl phenyl ether				•••		
		4-Chlorophenyl phenyl ether				•••		
		Bis(2-chloroisopropyl)ether				•••		
		Bis(2-chloroethyl)ether				•••		
		Diphenyl ether				•••		
		2,4-Dinitrotoluene				•••		
		2,6-Dinitrotoluene				•••		
		Bis(2-chloroethoxy)methane				•••		
		Diphenylamine				•••		
		N-Nitrosodiphenylamine				•••		
		N-Nitrosodi-n-propylamine				•••		
23	Extractables, Neutral -Chlorinated	1,2,3,4-Tetrachlorobenzene				•••		
		1,2,3,5-Tetrachlorobenzene				•••		
		1,2,4,5-Tetrachlorobenzene				•••		
		1,2,3-Trichlorobenzene				•••		
		1,2,4-Trichlorobenzene				•••		
		2,4,5-Trichlorotoluene				•••		
		Hexachlorobenzene				•••		
		Hexachlorobutadiene				•••		
		Hexachlorocyclopentadiene				•••		
		Hexachloroethene				•••		
		Octachlorostyrene				•••		
		Pentachlorobenzene				•••		

SCHEDULE 5: LAKE ONTARIO STEEL DIVISION OF CO - STEEL INC.

NAME OF STREAM:		South Pond				Storm Water Discharge Point	Waste Disposal Site
FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:		Yes				No	No
CHARACTERIZATION FREQUENCY (except for ATCs 24 and 27):		Quarterly				None	None
CHARACTERIZATION FREQUENCY FOR ATCs 24 and 27:		Semi-annually				None	None
OPEN CHARACTERIZATION FREQUENCY:		Quarterly				None	None
QUALITY CONTROL MONITORING REQUIRED:		Yes				No	No
FREQUENCY OF SAMPLING:		D	TW	W	M	M	Event Orientated
ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED						
25 Solvent Extractables	Oil and grease	•••				•••	•••
151 Iron	Iron			•••			

* Daphnia Magna Acute Lethality Toxicity Test

SCHEDULE 6: STELCO HILTON

NAME OF STREAM:			#2 Rod Mill				20" Mill				#1 60" Sewer	East Side Filter Plant			
FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:			Yes				Yes				No	Yes			
ARACTERIZATION FREQUENCY (except for ATGs 24 and 27):			Quarterly				Quarterly				None	Quarterly			
CHARACTERIZATION FREQUENCY FOR ATGs 24 and 27:			Semi-annually				Semi-annually				None	Semi-annually			
OPEN CHARACTERIZATION FREQUENCY:			Quarterly				Quarterly				None	Quarterly			
QUALITY CONTROL MONITORING REQUIRED:			No				No				Yes	Yes			
FREQUENCY OF SAMPLING:			D	TW	W	M	D	TW	W	M	TW	D	TW	W	M
ANALYTICAL TEST GROUP		PARAMETERS TO BE ANALYZED													
2	Cyanide	Cyanide				●●●							●●●		
3	Hydrogen ion (pH)	Hydrogen ion (pH)	●●●				●●●				●●●	●●●			
4a	Nitrogen	Ammonia plus Ammonium				●●●							●●●		
		Total Kjeldahl nitrogen													
4b		Nitrate + Nitrite													
5	Organic carbon (TOC/DOC)	Dissolved organic carbon (DOC)			●●●				●●●				●●●		
		Total organic carbon (TOC)													
6	Total phosphorus	Total phosphorus			●●●				●●●					●●●	
7	Specific conductance	Specific conductance	●●●				●●●					●●●			
8	Suspended solids (TSS/VSS)	Total suspended solids (TSS)	●●●				●●●				●●●	●●●			
		Volatile suspended solids (VSS)	●●●				●●●				●●●	●●●			
9	Total metals	Aluminum				●●●				●●●					●●●
		Beryllium				●●●				●●●					●●●
		Cadmium				●●●				●●●					●●●
		Chromium				●●●				●●●			●●●		
		Cobalt				●●●				●●●					●●●
		Copper				●●●				●●●					●●●
		Lead		●●●				●●●			●●●		●●●		
		Molybdenum				●●●				●●●					●●●

SCHEDULE 6: STELCO HILTON

		NAME OF STREAM:	#2 Rod Mill				20" Mill				#1 60" Sewer	East Side Filter Plant			
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	Yes				Yes				No	Yes			
		ARACTERIZATION FREQUENCY (except for ATGs 24 and 27):	Quarterly				Quarterly				None	Quarterly			
		CHARACTERIZATION FREQUENCY FOR ATGs 24 and 27:	Semi-annually				Semi-annually				None	Semi-annually			
		OPEN CHARACTERIZATION FREQUENCY:	Quarterly				Quarterly				None	Quarterly			
		QUALITY CONTROL MONITORING REQUIRED:	No				No				Yes	Yes			
		FREQUENCY OF SAMPLING:	D	TW	W	M	D	TW	W	M	TW	D	TW	W	M
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED													
9	Total metals (continued)	Nickel				●●●				●●●					●●●
		Silver				●●●				●●●					●●●
		Thallium				●●●				●●●					●●●
		Vanadium				●●●				●●●					●●●
		Zinc		●●●				●●●			●●●		●●●		
10	Hydrides	Antimony													●●●
		Arsenic													●●●
		Selenium													●●●
12	Mercury	Mercury													●●●
14	Phenolics (4AAP)	Phenolics (4AAP)			●●●				●●●				●●●		
16	Volatiles, Halogenated	1,1,2,2-Tetrachloroethane				●●●				●●●					●●●
		1,1,2-Trichloroethane				●●●				●●●					●●●
		1,1-Dichloroethane				●●●				●●●					●●●
		1,1-Dichloroethylene				●●●				●●●					●●●
		1,2-Dichlorobenzene				●●●				●●●					●●●
		1,2-Dichloroethane (Ethylene dichloride)				●●●				●●●					●●●
		1,2-Dichloropropane				●●●				●●●					●●●
		1,3-Dichlorobenzene				●●●				●●●					●●●
		1,4-Dichlorobenzene				●●●				●●●					●●●
		Bromoform				●●●				●●●					●●●
		Bromomethane				●●●				●●●					●●●
		Carbon tetrachloride				●●●				●●●					●●●
		Chlorobenzene				●●●				●●●					●●●

SCHEDULE 6: STELCO HILTON

		NAME OF STREAM:	#2 Rod Mill				20" Mill				#1 60" Sewer	East Side Filter Plant			
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	Yes				Yes				No	Yes			
		CHARACTERIZATION FREQUENCY (except for ATGs 24 and 27):	Quarterly				Quarterly				None	Quarterly			
		CHARACTERIZATION FREQUENCY FOR ATGs 24 and 27:	Semi-annually				Semi-annually				None	Semi-annually			
		OPEN CHARACTERIZATION FREQUENCY:	Quarterly				Quarterly				None	Quarterly			
		QUALITY CONTROL MONITORING REQUIRED:	No				No				Yes	Yes			
		FREQUENCY OF SAMPLING:	D	TW	W	M	D	TW	W	M	TW	D	TW	W	M
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED													
16	Volatiles, Halogenated (continued)	Chloroform				●●●				●●●					●●●
		Chloromethane				●●●				●●●					●●●
		Cis-1,3-Dichloropropylene				●●●				●●●					●●●
		Dibromochloromethane				●●●				●●●					●●●
		Ethylene dibromide				●●●				●●●					●●●
		Methylene chloride				●●●				●●●					●●●
		Tetrachloroethylene (Perchloroethylene)				●●●				●●●					●●●
		Trans-1,2-Dichloroethylene				●●●				●●●					●●●
		Trans-1,3-Dichloropropylene				●●●				●●●					●●●
		Trichloroethylene				●●●				●●●					●●●
		Trichlorofluoromethane				●●●				●●●					●●●
		Vinyl chloride (Chloroethylene)				●●●				●●●					●●●
17	Volatiles, Non-Halogenated	Benzene											●●●		
		Styrene													●●●
		Toluene													●●●
		o-Xylene													●●●
		m-Xylene and p-Xylene													●●●
19	Extractables, Base Neutral	Acenaphthene				●●●				●●●					●●●
		5-nitro Acenaphthene				●●●				●●●					●●●
		Acenaphthylene				●●●				●●●					●●●
		Anthracene				●●●				●●●					●●●
		Benz(a)anthracene				●●●				●●●					●●●
		Benzo(a)pyrene				●●●				●●●			●●●		
		Benzo(b)fluoranthene				●●●				●●●					●●●
		Benzo(g,h,i)perylene				●●●				●●●					●●●

SCHEDULE 6: STELCO HILTON

NAME OF STREAM:		#2 Rod Mill				20" Mill				#1 60" Sewer	East Side Filter Plant			
FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:		Yes				Yes				No	Yes			
CHARACTERIZATION FREQUENCY (except for ATGs 24 and 27):		Quarterly				Quarterly				None	Quarterly			
CHARACTERIZATION FREQUENCY FOR ATGs 24 and 27:		Semi-annually				Semi-annually				None	Semi-annually			
OPEN CHARACTERIZATION FREQUENCY:		Quarterly				Quarterly				None	Quarterly			
QUALITY CONTROL MONITORING REQUIRED:		No				No				Yes	Yes			
FREQUENCY OF SAMPLING:		D	TW	W	M	D	TW	W	M	TW	D	TW	W	M
ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED													
19	Extractables, Base Neutral (continued)	Benzo(k)fluoranthene				●●●				●●●					●●●
		Biphenyl				●●●				●●●					●●●
		Camphene				●●●				●●●					●●●
		1-Chloronaphthalene				●●●				●●●					●●●
		2-Chloronaphthalene				●●●				●●●					●●●
		Chrysene				●●●				●●●					●●●
		Dibenz(a,h)anthracene				●●●				●●●					●●●
		Fluoranthene				●●●				●●●					●●●
		Fluorene				●●●				●●●					●●●
		Indeno(1,2,3-cd)pyrene				●●●				●●●					●●●
		Indole				●●●				●●●					●●●
		1-Methylnaphthalene				●●●				●●●					●●●
		2-Methylnaphthalene				●●●				●●●					●●●
		Naphthalene				●●●				●●●					●●●
		Perylene				●●●				●●●			●●●		
		Phenanthrene				●●●				●●●					●●●
		Pyrene				●●●				●●●					●●●
		Benzyl butyl phthalate				●●●				●●●					●●●
		Bis(2-ethylhexyl) phthalate				●●●				●●●					●●●
		Di-n-butyl phthalate				●●●				●●●					●●●
		4-Bromophenyl phenyl ether				●●●				●●●					●●●
		4-Chlorophenyl phenyl ether				●●●				●●●					●●●
		Bis(2-chloroisopropyl)ether				●●●				●●●					●●●
		Bis(2-chloroethyl)ether				●●●				●●●					●●●
		Diphenyl ether				●●●				●●●					●●●

SCHEDULE 6: STELCO HILTON

		NAME OF STREAM:	#2 Rod Mill				20" Mill				#1 60" Sewer	East Side Filter Plant			
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	Yes				Yes				No	Yes			
		ARACTERIZATION FREQUENCY (except for ATGs 24 and 27):	Quarterly				Quarterly				None	Quarterly			
		CHARACTERIZATION FREQUENCY FOR ATGs 24 and 27:	Semi-annually				Semi-annually				None	Semi-annually			
		OPEN CHARACTERIZATION FREQUENCY:	Quarterly				Quarterly				None	Quarterly			
		QUALITY CONTROL MONITORING REQUIRED:	No				No				Yes	Yes			
		FREQUENCY OF SAMPLING:	D	TW	W	M	D	TW	W	M	TW	D	TW	W	M
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED													
19	Extractables, Base Neutral (continued)	2,4-Dinitrotoluene				●●●				●●●					●●●
		2,6-Dinitrotoluene				●●●				●●●					●●●
		Bis(2-chloroethoxy)methane				●●●				●●●					●●●
		Diphenylamine				●●●				●●●					●●●
		N-Nitrosodiphenylamine				●●●				●●●					●●●
		N-Nitrosodi-n-propylamine				●●●				●●●					●●●
20	Extractables, Acid (Phenolics)	2,3,4,5-Tetrachlorophenol													
		2,3,4,6-Tetrachlorophenol													●●●
		2,3,5,6-Tetrachlorophenol													●●●
		2,3,4-Trichlorophenol													●●●
		2,3,5-Trichlorophenol													●●●
		2,4,5-Trichlorophenol													●●●
		2,4,6-Trichlorophenol													●●●
		2,4-Dimethyl phenol													●●●
		2,4-Dinitrophenol													●●●
		2,4-Dichlorophenol													●●●
		2,6-Dichlorophenol													●●●
		4,6-Dinitro-o-cresol													●●●
		2-Chlorophenol													●●●
		4-Chloro-3-methyiphenol													●●●
		4-Nitrophenol													●●●
		m-Cresol													●●●
		o-Cresol													●●●
		p-Cresol													●●●
		Pentachlorophenol													●●●
		Phenol													●●●

SCHEDULE 6: STELCO HILTON

		NAME OF STREAM:	#2 Rod Mill				20" Mill				#1 60" Sewer	East Side Filter Plant			
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	Yes				Yes				No	Yes			
		ARACTERIZATION FREQUENCY (except for ATGs 24 and 27):	Quarterly				Quarterly				None	Quarterly			
		CHARACTERIZATION FREQUENCY FOR ATGs 24 and 27:	Semi-annually				Semi-annually				None	Semi-annually			
		OPEN CHARACTERIZATION FREQUENCY:	Quarterly				Quarterly				None	Quarterly			
		QUALITY CONTROL MONITORING REQUIRED:	No				No				Yes	Yes			
		FREQUENCY OF SAMPLING:	D	TW	W	M	D	TW	W	M	TW	D	TW	W	M
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED													
23	Extractables, Neutral -Chlorinated	1,2,3,4-Tetrachlorobenzene				●●●				●●●					●●●
		1,2,3,5-Tetrachlorobenzene				●●●				●●●					●●●
		1,2,4,5-Tetrachlorobenzene				●●●				●●●					●●●
		1,2,3-Trichlorobenzene				●●●				●●●					●●●
		1,2,4-Trichlorobenzene				●●●				●●●					●●●
		2,4,5-Trichlorotoluene				●●●				●●●					●●●
		Hexachlorobenzene				●●●				●●●					●●●
		Hexachlorobutadiene				●●●				●●●					●●●
		Hexachlorocyclopentadiene				●●●				●●●					●●●
		Hexachloroethane				●●●				●●●					●●●
		Octachlorostyrene				●●●				●●●					●●●
		Pentachlorobenzene				●●●				●●●					●●●
25	Solvent Extractables	Oil and grease	●●●				●●●				●●●	●●●			
IS1	Iron	Iron			●●●				●●●					●●●	

* Daphnia Magna Acute Lethality Toxicity Test

SCHEDULE 6: STELCO HILTON

		NAME OF STREAM:	North Outfall				West-Side Open Cut		North-West Outfall		#2 60" Sewer	East Side Filter Plant Overflow Weir
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	Yes				Yes		Yes		No	No
		ARACTERIZATION FREQUENCY (except for ATGs 24 and 27):	Quarterly				Quarterly		Quarterly		None	None
		CHARACTERIZATION FREQUENCY FOR ATGs 24 and 27:	Semi-annually				None		None		None	None
		OPEN CHARACTERIZATION FREQUENCY:	Quarterly				None		None		None	None
		QUALITY CONTROL MONITORING REQUIRED:	No				Yes		No		No	No
		FREQUENCY OF SAMPLING:	D	TW	W	M	W	M	W	M	M	M
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED										
2	Cyanide	Cyanide			●●●		●●●		●●●		●●●	●●●
3	Hydrogen ion (pH)	Hydrogen ion (pH)	●●●									
4a	Nitrogen	Ammonia plus Ammonium			●●●		●●●		●●●		●●●	●●●
		Total Kjeldahl nitrogen										
4b		Nitrate + Nitrite										
5	Organic carbon (TOC/DOC)	Dissolved organic carbon (DOC)		●●●				●●●		●●●		
		Total organic carbon (TOC)										
6	Total phosphorus	Total phosphorus			●●●			●●●		●●●		
7	Specific conductance	Specific conductance	●●●									
8	Suspended solids (TSS/VSS)	Total suspended solids (TSS)	●●●				●●●		●●●		●●●	●●●
		Volatile suspended solids (VSS)	●●●				●●●		●●●		●●●	●●●
9	Total metals	Aluminum				●●●						
		Beryllium				●●●						
		Cadmium				●●●						
		Chromium				●●●						
		Cobalt				●●●					●●●	●●●
		Copper				●●●						
		Lead		●●●				●●●		●●●	●●●	●●●
		Molybdenum				●●●						

SCHEDULE 6: STELCO HILTON

		NAME OF STREAM:	North Outfall				West-Side Open Cut		North-West Outfall		#2 60" Sewer	East Side Filter Plant Overflow Weir
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	Yes				Yes		Yes		No	No
		ARACTERIZATION FREQUENCY (except for ATGs 24 and 27):	Quarterly				Quarterly		Quarterly		None	None
		CHARACTERIZATION FREQUENCY FOR ATGs 24 and 27:	Semi-annually				None		None		None	None
		OPEN CHARACTERIZATION FREQUENCY:	Quarterly				None		None		None	None
		QUALITY CONTROL MONITORING REQUIRED:	No				Yes		No		No	No
		FREQUENCY OF SAMPLING:	D	TW	W	M	W	M	W	M	M	M
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED										
9	Total metals (continued)	Nickel				•••						
		Silver				•••						
		Thallium				•••						
		Vanadium				•••						
		Zinc		•••			•••		•••		•••	•••
10	Hydrides	Antimony										
		Arsenic										
		Selenium										
12	Mercury	Mercury										
14	Phenolics (4AAP)	Phenolics (4AAP)			•••		•••		•••		•••	•••
16	Volatiles, Halogenated	1,1,2,2-Tetrachloroethane				•••						
		1,1,2-Trichloroethane				•••						
		1,1-Dichloroethane				•••						
		1,1-Dichloroethylene				•••						
		1,2-Dichlorobenzene				•••						
		1,2-Dichloroethane (Ethylene dichloride)				•••						
		1,2-Dichloropropane				•••						
		1,3-Dichlorobenzene				•••						
		1,4-Dichlorobenzene				•••						
		Bromoform				•••						
		Bromomethane				•••						
		Carbon tetrachloride				•••						
		Chlorobenzene				•••						

SCHEDULE 6: STELCO HILTON

		NAME OF STREAM:	North Outfall				West-Side Open Cut		North-West Outfall		#2 60" Sewer	East Side Filter Plant Overflow Weir
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	Yes				Yes		Yes		No	No
		ARACTERIZATION FREQUENCY (except for ATGs 24 and 27):	Quarterly				Quarterly		Quarterly		None	None
		CHARACTERIZATION FREQUENCY FOR ATGs 24 and 27:	Semi-annually				None		None		None	None
		OPEN CHARACTERIZATION FREQUENCY:	Quarterly				None		None		None	None
		QUALITY CONTROL MONITORING REQUIRED:	No				Yes		No		No	No
		FREQUENCY OF SAMPLING:	D	TW	W	M	W	M	W	M	M	M
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED										
16	Volatiles, Halogenated (continued)	Chloroform				●●●						
		Chloromethane				●●●						
		Cis-1,3-Dichloropropylene				●●●						
		Dibromochloromethane				●●●						
		Ethylene dibromide				●●●						
		Methylene chloride				●●●						
		Tetrachloroethylene (Perchloroethylene)				●●●						
		Trans-1,2-Dichloroethylene				●●●						
		Trans-1,3-Dichloropropylene				●●●						
		Trichloroethylene				●●●						
		Trichlorofluoromethane				●●●						
		Vinyl chloride (Chloroethylene)				●●●						
17	Volatiles, Non-Halogenated	Benzene										
		Styrene									●●●	●●●
		Toluene										
		o-Xylene										
		m-Xylene and p-Xylene										
19	Extractables, Base Neutral	Acenaphthene				●●●						
		5-nitro Acenaphthene				●●●						
		Acenaphthylene				●●●						
		Anthracene				●●●						
		Benz(a)anthracene				●●●						
		Benzo(a)pyrene				●●●						
		Benzo(b)fluoranthene				●●●					●●●	●●●
		Benzo(g,h,i)perylene				●●●						

SCHEDULE 6: STELCO HILTON

		NAME OF STREAM:	North Outfall				West-Side Open Cut		North-West Outfall		#2 60" Sewer	East Side Filter Plant Overflow Weir
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	Yes				Yes		Yes		No	No
		ARACTERIZATION FREQUENCY (except for ATGs 24 and 27):	Quarterly				Quarterly		Quarterly		None	None
		CHARACTERIZATION FREQUENCY FOR ATGs 24 and 27:	Semi-annually				None		None		None	None
		OPEN CHARACTERIZATION FREQUENCY:	Quarterly				None		None		None	None
		QUALITY CONTROL MONITORING REQUIRED:	No				Yes		No		No	No
		FREQUENCY OF SAMPLING:	D	TW	W	M	W	M	W	M	M	M
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED										
19	Extractables, Base Neutral (continued)	Benzo(k)fluoranthene				•••						
		Biphenyl				•••						
		Camphene				•••						
		1-Chloronaphthalene				•••						
		2-Chloronaphthalene				•••						
		Chrysene				•••						
		Dibenz(a,h)anthracene				•••						
		Fluoranthene				•••						
		Fluorene				•••						
		Indeno(1,2,3-cd)pyrene				•••						
		Indole				•••						
		1-Methylnaphthalene				•••						
		2-Methylnaphthalene				•••						
		Naphthalene				•••					•••	•••
		Perylene				•••						
		Phenanthrene				•••						
		Pyrene				•••						
		Benzyl butyl phthalate				•••						
		Bis(2-ethylhexyl) phthalate				•••						
		Di-n-butyl phthalate				•••						
		4-Bromophenyl phenyl ether				•••						
		4-Chlorophenyl phenyl ether				•••						
		Bis(2-chloroisopropyl)ether				•••						
		Bis(2-chloroethyl)ether				•••						
		Diphenyl ether				•••						

SCHEDULE 6: STELCO HILTON

		NAME OF STREAM:	North Outfall				West-Side Open Cut		North-West Outfall		#2 60" Sewer	East Side Filter Plant Overflow Weir
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	Yes				Yes		Yes		No	No
		ARACTERIZATION FREQUENCY (except for ATGs 24 and 27):	Quarterly				Quarterly		Quarterly		None	None
		CHARACTERIZATION FREQUENCY FOR ATGs 24 and 27:	Semi-annually				None		None		None	None
		OPEN CHARACTERIZATION FREQUENCY:	Quarterly				None		None		None	None
		QUALITY CONTROL MONITORING REQUIRED:	No				Yes		No		No	No
		FREQUENCY OF SAMPLING:	D	TW	W	M	W	M	W	M	M	M
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED										
19	Extractables, Base Neutral (continued)	2,4-Dinitrotoluene				●●●						
		2,6-Dinitrotoluene				●●●						
		Bis(2-chloroethoxy)methane				●●●						
		Diphenylamine				●●●						
		N-Nitrosodiphenylamine				●●●						
		N-Nitrosodi-n-propylamine				●●●						
20	Extractables, Acid (Phenolics)	2,3,4,5-Tetrachlorophenol										
		2,3,4,6-Tetrachlorophenol										
		2,3,5,6-Tetrachlorophenol										
		2,3,4-Trichlorophenol										
		2,3,5-Trichlorophenol										
		2,4,5-Trichlorophenol										
		2,4,6-Trichlorophenol										
		2,4-Dimethyl phenol										
		2,4-Dinitrophenol										
		2,4-Dichlorophenol										
		2,6-Dichlorophenol										
		4,6-Dinitro-o-cresol										
		2-Chlorophenol										
		4-Chloro-3-methylphenol										
		4-Nitrophenol										
		m-Cresol										
		o-Cresol										
		p-Cresol										
		Pentachlorophenol										
		Phenol										

SCHEDULE 6: STELCO HILTON

		NAME OF STREAM:	North Outfall				West-Side Open Cut		North-West Outfall		#2 60" Sewer	East Side Filter Plant Overflow Weir
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	Yes				Yes		Yes		No	No
		ARACTERIZATION FREQUENCY (except for ATGs 24 and 27):	Quarterly				Quarterly		Quarterly		None	None
		CHARACTERIZATION FREQUENCY FOR ATGs 24 and 27:	Semi-annually				None		None		None	None
		OPEN CHARACTERIZATION FREQUENCY:	Quarterly				None		None		None	None
		QUALITY CONTROL MONITORING REQUIRED:	No				Yes		No		No	No
		FREQUENCY OF SAMPLING:	D	TW	W	M	W	M	W	M	M	M
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED										
23	Extractables, Neutral -Chlorinated	1,2,3,4-Tetrachlorobenzene										
		1,2,3,5-Tetrachlorobenzene				•••						
		1,2,4,5-Tetrachlorobenzene				•••						
		1,2,3-Trichlorobenzene				•••						
		1,2,4-Trichlorobenzene				•••						
		2,4,5-Trichlorotoluene				•••						
		Hexachlorobenzene				•••						
		Hexachlorobutadiene				•••						
		Hexachlorocyclopentadiene				•••						
		Hexachloroethane				•••						
		Octachlorostyrene				•••						
		Pentachlorobenzene				•••						
25	Solvent Extractables	Oil and grease	•••				•••		•••		•••	•••
IS1	Iron	Iron			•••		•••		•••			

* Daphnia Magna Acute Lethality Toxicity Test

SCHEDULE 7: STELCO LAKE ERIE WORKS

		NAME OF STREAM:	Blowdown Treatment Plant			#4 Pond Discharge				Storm Water Pond #2	Lagoon E	Coal Storage Area
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	No			Yes				No	No	No
		ARACTERIZATION FREQUENCY (except for ATGs 24 and 27):	None			Quarterly				None	None	None
		CHARACTERIZATION FREQUENCY FOR ATGs 24 and 27:	None			Semi-annually				None	None	None
		OPEN CHARACTERIZATION FREQUENCY:	None			Quarterly				None	None	None
		QUALITY CONTROL MONITORING REQUIRED:	Yes			Yes				No	No	No
		FREQUENCY OF SAMPLING:	TW	W	M	D	TW	W	M	M	Event Orientated	Event Orientated
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED										
2	Cyanide	Cyanide	●●●					●●●		●●●	●●●	●●●
3	Hydrogen ion (pH)	Hydrogen ion (pH)	●●●			●●●					●●●	
4a	Nitrogen	Ammonia plus Ammonium	●●●					●●●		●●●	●●●	●●●
		Total Kjeldahl nitrogen										
4b		Nitrate + Nitrite					●●●					
5	Organic carbon (TOC/DOC)	Dissolved organic carbon (DOC)										
		Total organic carbon (TOC)		●●●				●●●				
6	Total phosphorus	Total phosphorus				●●●						
7	Specific conductance	Specific conductance								●●●	●●●	●●●
8	Suspended solids (TSS/VSS)	Total suspended solids (TSS)	●●●			●●●				●●●	●●●	●●●
		Volatile suspended solids (VSS)	●●●			●●●						
9	Total metals	Aluminum							●●●			
		Beryllium							●●●			
		Cadmium							●●●	●●●	●●●	●●●
		Chromium	●●●						●●●			
		Cobalt							●●●			
		Copper							●●●	●●●	●●●	●●●
		Lead	●●●						●●●			
		Molybdenum										

SCHEDULE 7: STELCO LAKE ERIE WORKS

		NAME OF STREAM:	Blowdown Treatment Plant			#4 Pond Discharge				Storm Water Pond #2	Lagoon E	Coal Storage Area
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	No			Yes				No	No	No
		ARACTERIZATION FREQUENCY (except for ATGs 24 and 27):	None			Quarterly				None	None	None
		CHARACTERIZATION FREQUENCY FOR ATGs 24 and 27:	None			Semi-annually				None	None	None
		OPEN CHARACTERIZATION FREQUENCY:	None			Quarterly				None	None	None
		QUALITY CONTROL MONITORING REQUIRED:	Yes			Yes				No	No	No
		FREQUENCY OF SAMPLING:	TW	W	M	D	TW	W	M	M	Event Orientated	Event Orientated
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED										
9	Total metals (continued)	Nickel							●●●			
		Silver							●●●			
		Thallium							●●●			
		Vanadium							●●●			
		Zinc	●●●						●●●	●●●	●●●	●●●
10	Hydrides	Antimony							●●●			
		Arsenic							●●●			
		Selenium							●●●			
12	Mercury	Mercury							●●●			
14	Phenolics (4AAP)	Phenolics (4AAP)	●●●					●●●		●●●	●●●	●●●
15	Sulphide	Sulphide									●●●	
16	Volatiles, Halogenated	1,1,2,2-Tetrachloroethane							●●●			
		1,1,2-Trichloroethane							●●●			
		1,1-Dichloroethane							●●●			
		1,1-Dichloroethylene							●●●			
		1,2-Dichlorobenzene							●●●			
		1,2-Dichloroethane (Ethylene dichloride)							●●●			
		1,2-Dichloropropane							●●●			
		1,3-Dichlorobenzene							●●●			
		1,4-Dichlorobenzene							●●●			
		Bromoform							●●●			
		Bromomethane							●●●			

SCHEDULE 7: STELCO LAKE ERIE WORKS

		NAME OF STREAM:	Blowdown Treatment Plant			#4 Pond Discharge				Storm Water Pond #2	Lagoon E	Coal Storage Area
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	No			Yes				No	No	No
		ARACTERIZATION FREQUENCY (except for ATGs 24 and 27):	None			Quarterly				None	None	None
		CHARACTERIZATION FREQUENCY FOR ATGs 24 and 27:	None			Semi-annually				None	None	None
		OPEN CHARACTERIZATION FREQUENCY:	None			Quarterly				None	None	None
		QUALITY CONTROL MONITORING REQUIRED:	Yes			Yes				No	No	No
		FREQUENCY OF SAMPLING:	TW	W	M	D	TW	W	M	M	Event Orientated	Event Orientated
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED										
16	Volatiles, Halogenated (continued)	Carbon tetrachloride							●●●			
		Chlorobenzene							●●●			
		Chloroform							●●●			
		Chloromethane							●●●			
		Cis-1,3-Dichloropropylene							●●●			
		Dibromochloromethane							●●●			
		Ethylene dibromide							●●●			
		Methylene chloride							●●●			
		Tetrachloroethylene (Perchloroethylene)							●●●			
		Trans-1,2-Dichloroethylene							●●●			
		Trans-1,3-Dichloropropylene							●●●			
		Trichloroethylene							●●●			
		Trichlorofluoromethane							●●●			
		Vinyl chloride (Chloroethylene)										
									●●●	●●●	●●●	●●●
17	Volatiles, Non-Halogenated	Benzene	●●●						●●●			
		Styrene			●●●				●●●			
		Toluene			●●●				●●●			
		o-Xylene			●●●				●●●			
		m-Xylene and p-Xylene			●●●				●●●			
19	Extractables, Base Neutral	Acenaphthene			●●●				●●●			
		5-nitro Acenaphthene			●●●				●●●			
		Acenaphthylene			●●●				●●●			
		Anthracene			●●●				●●●			
		Benz(a)anthracene			●●●				●●●			
		Benzo(a)pyrene	●●●						●●●	●●●	●●●	●●●

SCHEDULE 7: STELCO LAKE ERIE WORKS

		NAME OF STREAM:	Blowdown Treatment Plant			#4 Pond Discharge				Storm Water Pond #2	Lagoon E	Coal Storage Area
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	No			Yes				No	No	No
		ARACTERIZATION FREQUENCY (except for ATGs 24 and 27):	None			Quarterly				None	None	None
		CHARACTERIZATION FREQUENCY FOR ATGs 24 and 27:	None			Semi-annually				None	None	None
		OPEN CHARACTERIZATION FREQUENCY:	None			Quarterly				None	None	None
		QUALITY CONTROL MONITORING REQUIRED:	Yes			Yes				No	No	No
		FREQUENCY OF SAMPLING:	TW	W	M	D	TW	W	M	M	Event Orientated	Event Orientated
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED										
19	Extractables, Base Neutral (continued)	Benzo(b)fluoranthene			●●●				●●●			
		Benzo(g,h,i)perylene			●●●				●●●			
		Benzo(k)fluoranthene			●●●				●●●			
		Biphenyl			●●●				●●●			
		Camphene			●●●				●●●			
		1-Chloronaphthalene			●●●				●●●			
		2-Chloronaphthalene			●●●				●●●			
		Chrysene			●●●				●●●			
		Dibenz(a,h)anthracene			●●●				●●●			
		Fluoranthene			●●●				●●●			
		Fluorene			●●●				●●●			
		Indeno(1,2,3-cd)pyrene			●●●				●●●			
		Indole			●●●				●●●			
		1-Methylnaphthalene			●●●				●●●			
		2-Methylnaphthalene			●●●				●●●			
		Naphthalene	●●●						●●●	●●●	●●●	●●●
		Perylene			●●●				●●●			
		Phenanthrene			●●●				●●●			
		Pyrene			●●●				●●●			
		Benzyl butyl phthalate			●●●				●●●			
		Bis(2-ethylhexyl) phthalate			●●●				●●●			
		Di-n-butyl phthalate			●●●				●●●			
		4-Bromophenyl phenyl ether			●●●				●●●			
		4-Chlorophenyl phenyl ether			●●●				●●●			
		Bis(2-chloroisopropyl)ether			●●●				●●●			
		Bis(2-chloroethyl)ether			●●●				●●●			
		Diphenyl ether			●●●				●●●			

SCHEDULE 7: STELCO LAKE ERIE WORKS

		NAME OF STREAM:	Blowdown Treatment Plant			#4 Pond Discharge				Storm Water Pond #2	Lagoon E	Coal Storage Area
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	No			Yes				No	No	No
		ARACTERIZATION FREQUENCY (except for ATGs 24 and 27):	None			Quarterly				None	None	None
		CHARACTERIZATION FREQUENCY FOR ATGs 24 and 27:	None			Semi-annually				None	None	None
		OPEN CHARACTERIZATION FREQUENCY:	None			Quarterly				None	None	None
		QUALITY CONTROL MONITORING REQUIRED:	Yes			Yes				No	No	No
		FREQUENCY OF SAMPLING:	TW	W	M	D	TW	W	M	M	Event Orientated	Event Orientated
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED										
19	Extractables, Base Neutral (continued)	2,4-Dinitrotoluene			•••				•••			
		2,6-Dinitrotoluene			•••				•••			
		Bis(2-chloroethoxy)methane			•••				•••			
		Diphenylamine			•••				•••			
		N-Nitrosodiphenylamine			•••				•••			
		N-Nitrosodi-n-propylamine			•••				•••			
20	Extractables, Acid (Phenolics)	2,3,4,5-Tetrachlorophenol							•••			
		2,3,4,6-Tetrachlorophenol							•••			
		2,3,5,6-Tetrachlorophenol							•••			
		2,3,4-Trichlorophenol							•••			
		2,3,5-Trichlorophenol							•••			
		2,4,5-Trichlorophenol							•••			
		2,4,6-Trichlorophenol							•••			
		2,4-Dimethyl phenol							•••			
		2,4-Dinitrophenol							•••			
		2,4-Dichlorophenol							•••			
		2,6-Dichlorophenol							•••			
		4,6-Dinitro-o-cresol							•••			
		2-Chlorophenol							•••			
		4-Chloro-3-methylphenol							•••			
		4-Nitrophenol							•••			
		m-Cresol							•••			
		o-Cresol							•••			
		p-Cresol							•••			
		Pentachlorophenol							•••			
		Phenol							•••			

SCHEDULE 7: STELCO LAKE ERIE WORKS

		NAME OF STREAM:	Blowdown Treatment Plant			#4 Pond Discharge				Storm Water Pond #2	Lagoon E	Coal Storage Area
		FISH TOXICITY TEST & DAPHNIA MAGNA* TEST REQUIRED:	No			Yes				No	** No	No
		ARACTERIZATION FREQUENCY (except for ATGs 24 and 27):	None			Quarterly				None	None	None
		CHARACTERIZATION FREQUENCY FOR ATGs 24 and 27:	None			Semi-annually				None	None	None
		OPEN CHARACTERIZATION FREQUENCY:	None			Quarterly				None	None	None
		QUALITY CONTROL MONITORING REQUIRED:	Yes			Yes				No	No	No
		FREQUENCY OF SAMPLING:	TW	W	M	D	TW	W	M	M	Event Orientated	Event Orientated
	ANALYTICAL TEST GROUP	PARAMETERS TO BE ANALYZED										
23	Extractables, Neutral -Chlorinated	1,2,3,4-Tetrachlorobenzene							●●●			
		1,2,3,5-Tetrachlorobenzene							●●●			
		1,2,4,5-Tetrachlorobenzene							●●●			
		1,2,3-Trichlorobenzene							●●●			
		1,2,4-Trichlorobenzene							●●●			
		2,4,5-Trichlorotoluene							●●●			
		Hexachlorobenzene							●●●			
		Hexachlorobutadiene							●●●			
		Hexachlorocyclopentadiene							●●●			
		Hexachloroethane							●●●			
		Octachlorostyrene							●●●			
		Pentachlorobenzene							●●●			
25	Solvent Extractables	Oil and grease	●●●			●●●				●●●	●●●	●●●

* Daphnia Magna Acute Lethality Toxicity Test

PART IV

EXPLANATORY NOTES TO THE DRAFT EFFLUENT MONITORING REGULATION FOR THE IRON AND STEEL SECTOR

PART IV - EXPLANATORY NOTES TO THE DRAFT EFFLUENT MONITORING REGULATION FOR THE IRON AND STEEL SECTOR

INTRODUCTION

These Explanatory Notes provide an expanded description of each of the sections in the Draft Effluent Monitoring Regulation for the Iron and Steel Sector in order to further the reader's understanding of the regulatory requirements.

In conjunction with the protocols and procedures outlined in Ontario Regulation XXX/88, the General Effluent Monitoring Regulation, the Iron and Steel Sector Regulation specifies the effluent monitoring requirements for each discharger, including sampling, analysis, flow measurement, toxicity testing and reporting.

SECTION 1: DEFINITIONS

This section does not redefine terms which are already defined in the Environmental Protection Act under which the Iron and Steel Sector Regulation is written.

This section of the Regulation provides:

- clarification of the terms used in the Regulation having several possible interpretations;
- definitions of the technical terms used in the Regulation which may not be in common usage;
- definitions of the terms which have different meanings in the Regulation than those found in a dictionary or through common use;
- definitions of those terms which have different uses in the Iron and Steel Sector Regulation than those in the General Regulation; and
- definitions of the terms which are specific to the Iron and Steel Sector.

Subsection 1(2) states that the definitions in section 1 of the General Regulation also apply to this Regulation. However, a re-defined term in the Iron and Steel Sector Regulation supercedes that of the General Regulation.

All of the definitions in the General Regulation have been applied to the Iron and Steel Sector Regulation with the following exceptions:

- characterization has been redefined in the Iron and Steel Sector Regulation to reference the iron and steel sector characterization lists which are specific to the Iron and Steel Sector;

- cooling water has been redefined to specify discharge to a surface watercourse;

- emergency overflow has been redefined as a diversion of effluent that by-passes a final effluent sampling point;

- open characterization has been redefined to include the identification and quantification of parameters in analytical test groups 16, 17, 19, 20 and 23 at the method detection limits specified in Schedule 3 of the General Effluent Monitoring Regulation and the identification and determination of the approximate quantity of a parameter in analytical test groups 28 and 29;

- waste disposal site effluent has been redefined as any liquid from a waste disposal site which has been in contact with the waste and which is collected for discharge to a surface watercourse;

The following definitions are included in the Iron and Steel Sector Regulation rather than the General Regulation as they are referred to only in the context of the Iron and Steel Sector Regulation:

- acid pickling;
- cold forming;
- cokemaking;
- cooling water;
- cooling water sampling point;
- cooling water stream;
- final effluent;
- final effluent sampling point;
- final effluent stream;
- final treatment;
- hot forming;
- ironmaking;
- process change;
- process subcategory
- process subcategory effluent;
- process subcategory effluent sampling point;
- process subcategory effluent stream;
- salt bath descaling;

- semi-annually;
- sintering;
- steelmaking wet process;
- storage site;
- storage site effluent;
- storage site effluent sampling point;
- storage site effluent stream;
- treatment;

SECTION 2: PURPOSE

The purpose of the Iron and Steel Sector Regulation is to establish a data base on effluent quality in the iron and steel sector that will be used, along with other pertinent information such as available treatment technology, to develop effluent limits for the iron and steel sector.

SECTION 3: APPLICATION

Subsection 3(2) lists the iron and steel mills to which this Regulation applies and indicates that there are site-specific monitoring schedules within the Regulation which apply to each facility.

Subsection 3(3) states that the iron and steel sector regulation is a Sectoral Effluent Monitoring Regulation in the context of the General Effluent Monitoring Regulation.

Subsection 3(4) states that all the monitoring obligations of the Iron and Steel Sector Regulation shall be carried out in accordance with the requirements of the General Effluent Monitoring Regulation and in accordance with the analytical principles listed in Schedules D and E of the Iron and Steel Sector Regulation.

Subsection 3(5) pertains to actions performed by persons other than the direct discharger. That is, a consultant or laboratory that collects and/or analyses the samples for the discharger has in effect carried out the obligations of that discharger.

Section 3(8) states that the sampling and flow measurement obligations for final effluent and process subcategory effluent shall meet the requirements for combined effluent as specified in the General Effluent Monitoring Regulation.

Section 3(9) states that a grab sample should be collected when the direct discharger is required by the regulation to sample for the analytical test groups 15 to 17 (ie. sulphides, halogenated volatiles and non-halogenated volatiles) and 28a (ie. open characterization - volatiles). This is a deviation from the requirements of the General Regulation where the discharger is required to collect three grab samples and combine the samples in the laboratory. The total number of samples generated by both methods is the same. However, the collection of one grab sample for the analysis of volatile compounds will minimize the losses that may result during the compositing process.

Section 3(10) states that if the direct discharger cannot collect a sufficient volume of sample from a sampling point to perform all of the required analyses due to the collection of inspection samples or due to a lack of flow, then the direct discharger should collect a set of samples sufficient to perform all of the analyses for that sampling point on the following day or when the flow resumes and should conduct the analyses required for that sampling point.

The Iron and Steel Sector Regulation incorporates the monitoring requirements for those effluents under IMIS, Certificates of Approval or Control Orders for the duration of the Regulation. This override will not extend to any effluent stream not monitored in the Regulation and for which monitoring is required to assess the performance of various treatment systems or processes.

SECTION 4: SAMPLING POINTS

This section specifies that a sampling point must be established by the direct discharger for each effluent stream specified in the site-specific monitoring schedules. These sampling points must be used for all sampling required by the Iron and Steel Sector Regulation unless an alternate sampling location is deemed acceptable by a Regional Director of the Ministry of the Environment.

Subsection 4(3) states that in order for a direct discharger to establish an additional sampling point under the regulation certain requirements must be met concerning sampling frequency, sampling procedures, quality control, flow measurement and reporting requirements.

SECTION 5: CHARACTERIZATION

Characterization samples must be collected and analyzed according to the principles and protocols outlined in sections 3 and 4 of the General Regulation for sampling and analysis respectively.

The site-specific monitoring schedules for each direct discharger indicate the required frequency for performing characterization sampling and analyses on final effluent and cooling water effluent samples under the Regulation. Sampling periods are specified in order to ensure that the samples are representative of discrete events and to provide an indication of seasonal impact on the effluents.

For the purpose of characterization, the iron and steel sector has been divided into integrated iron and steel mills and specialty steel producers and mini-mills. Integrated mills include cokemaking and ironmaking processes which generate most of the priority pollutants for this sector. Mini-mills and specialty steel producers generally purchase scrap metal which they melt to produce low carbon steel and specialty steel products.

The following analytical test groups will be used for the characterization of final effluents from integrated iron and steel mills and form Schedule A:

- Group 2 Cyanide;
- Group 3 Hydrogen ion (pH);
- Group 4 Nitrogen;
- Group 5 Organic Carbon
- Group 6 Total Phosphorus;
- Group 7 Specific conductance;
- Group 8 Suspended Solids
- Group 9 Total metals;
- Group 10 Hydrides;
- Group 11 Chromium (Hexavalent)
- Group 12 Mercury;
- Group 14 Phenolics (4AAP);
- Group 15 Sulphide;
- Group 16 Volatiles, Halogenated;
- Group 17 Volatiles, Non-Halogenated;
- Group 19 Extractables, Base Neutral;
- Group 20 Extractables, Acid (Phenolics);
- Group 23 Extractables, Neutral Chlorinated;
- Group 24 Chlorinated Dibenzo-p-dioxins and Dibenzofurans;
- Group 25 Solvent Extractables;
- Group 26 Fatty and Resin Acids;
- Group 27 PCBs (Total).

The following analytical test groups will be used for characterization of final effluents from specialty steel and mini-mill operations and form Schedule B:

- Group 3 Hydrogen ion (pH);
- Group 4 Nitrogen;
- Group 5 Organic Carbon
- Group 6 Total Phosphorus;
- Group 7 Specific conductance;
- Group 8 Suspended Solids
- Group 9 Total metals;
- Group 10 Hydrides;
- Group 11 Chromium (Hexavalent)
- Group 16 Volatiles, Halogenated;
- Group 17 Volatiles, Non-Halogenated;
- Group 19 Extractables, Base Neutral;
- Group 20 Extractables, Acid (Phenolics);
- Group 23 Extractables, Neutral Chlorinated;
- Group 24 Chlorinated Dibenzo-p-dioxins and Dibenzofurans;
- Group 25 Solvent Extractables;;
- Group 27 PCBs (Total).

It should be noted that Schedules A and B include the conventional and priority pollutants outlined in the General Effluent Monitoring Regulation with the exception of the following analytical test groups:

- Group 1 Chemical Oxygen Demand;
- Group 13 Total Alkyl Lead;
- Group 18 Volatiles, Water Soluble;
- Group 21 Extractables, Phenoxy Acid Herbicides;
- Group 22 Extractables, Organochlorine Pesticides;

Group 1 was deleted from both the Schedules because Dissolved Organic Carbon (Group 5a) has a far lower detection limit than Chemical Oxygen Demand and is therefore, a more suitable monitoring parameter. Groups 13, 18, 21 and 22 are not generated during iron and steelmaking and have not been detected in effluents from iron and steelmaking process and unit operations. In addition, the following analytical test groups were excluded from Schedule B because they are only generated at iron and steelmaking facilities that have coking and ironmaking operations.

- Group 2 Cyanide;
- Group 12 Mercury;
- Group 14 Phenolics (4AAP);
- Group 15 Sulphide;
- Group 26 Fatty and Resin Acids;

The characterization of final effluent streams consists of the identification and quantification of compounds in the respective Schedule A or B for each discharger at the method detection limits specified in the General Regulation.

Open characterization of final effluent streams consists of the identification and quantification of target compounds in analytical test groups 16, 17, 19, 20 and 23 at the method detection limits specified in the General Regulation and the identification and determination of the approximate quantity of parameters in analytical test groups 28 and 29.

In order to quantify target compounds at the method detection limits specified in the General Effluent Monitoring Regulation, the following conditions must be met:

- no chemical clean-up is used;
- standards must be available for the target compounds;
- recoveries and response factors for the target compounds must be obtained by spiking organic free water;
- target compounds must be quantified relative to the same internal standards used in the sector list characterizations, These concentrations are quantitative. Quantitations is based on one-to-one compound calibration;
- Non-target compounds are quantitated relative to the same internal standards used in the open characterization. These concentrations are semi-quantitative;

Final effluent characterization for parameters in the Schedules A and B, except for analytical test groups 24 and 27, will be conducted quarterly during the months of January, April, July and October. Open characterization of final effluent streams will be conducted quarterly during the months of February, May, August and November.

In total, eight characterization analyses will be conducted on each final effluent stream for the analytical test groups 16, 17, 19, 20 and 23.

The regulation requires that there be a fifteen day period between characterization and open characterization analyses in order that representative data on different operating conditions is collected.

Final effluent characterization for analytical test groups 24 and 27 will be conducted semi-annually because of the very low probability of detecting parameters from these analytical test groups in iron and steelmaking effluents.

Characterization of cooling water will be conducted in order to identify any contaminants that may be present in cooling water streams due to cross-contamination with process subcategory effluent streams. Cooling water characterization for parameters in the respective Schedule A or B for each discharger, except for analytical test groups 24 and 27, will be conducted on a quarterly basis.

The quarterly characterization of final effluent streams and cooling water streams for parameters in the respective Schedule A or B for that discharger will be conducted at the same time to facilitate a comparison of loadings and to tell whether cooling water is contaminated.

The daily, thrice weekly, weekly and monthly monitoring requirements contained in the Regulation can be used to fulfill characterization and open characterization requirements provided that the protocols required for characterization analyses are followed.

ROUTINE MONITORING

The requirements for routine monitoring of effluents are specified in sections 6 through 16 of the Iron and Steel Sector Regulation. All routine monitoring samples must be collected and analyzed according to the principles and protocols outlined in sections 3 and 4 of the General Regulation for sampling and analysis respectively.

SECTION 6: DAILY MONITORING

All final effluent streams will be monitored for the following analytical test groups,

- Group 3 Hydrogen Ion (pH);
- Group 7 Specific Conductance.
- Group 8 Suspended Solids;
- Group 25 Oil and Grease;

This common set of parameters will facilitate a comparison among iron and steel plants.

SECTION 7: THRICE-WEEKLY MONITORING

Process subcategory effluent streams are to be monitored prior to dilution and after a treatment but before final treatment if such exists. Parameters that are candidate for control will be monitored thrice weekly. These parameters have been assigned as follows:

Cokemaking	Ammonia Benzene Benzo(a)pyrene Cyanide Naphthalene Oil and Grease Phenolics (4AAP) Suspended Solids
Sintering	Ammonia Cyanide Phenolics (4AAP) Suspended Solids
Ironmaking	Ammonia Cyanide Phenolics (4AAP) Suspended Solids Zinc
Steelmaking (wet process)	Lead Oil and Grease Suspended Solids Zinc
Hot Forming	Lead/Nickel/Chromium Oil and Grease pH Suspended Solids Zinc
Salt Bath Descaling	Hexavalent Chromium Nickel pH Suspended Solids
Acid Pickling	Chromium Oil and Grease Lead pH Suspended Solids Zinc

Cold Forming	Chromium Lead Oil and Grease pH Suspended Solids Zinc

* For Specialty Steel Mills, the parameter lead will be replaced by nickel and chromium because nickel and chromium are generated during descaling operations.

Final effluents which do not receive monitored process subcategory effluent streams will be monitored thrice weekly for some or all of the compounds listed above.

The rationale for the assignment of parameters to process subcategory effluents is presented in Part II of the Development Document.

SECTION 8: WEEKLY MONITORING

Weekly monitoring is for parameters that are currently monitored under IMIS, Certificates of Approval or Control Orders. Parameters that are currently being monitored at a higher frequency than weekly will be monitored at that higher frequency during the Regulation period.

The following parameters may be monitored weekly: phenol, cyanide, ammonia, iron, total phosphorus and sulphide.

A minimum of two days between consecutive weekly samples is required in order to avoid sample correlation and thus increase sample randomness.

Weekly samples must be collected on the same day as the thrice weekly samples for the same effluent stream in order to provide as complete a set of analytical data on a given day as possible.

SECTION 9: WEEKLY MONITORING - POST REGULATION

Section 9 comes into force on the first day following the initial one year monitoring period and will continue for six months. Each plant will be required to continue monitoring weekly for the parameters in analytical test groups 2, 3, 4a, 5, 6, 7, 8, 9, 14, 25 and IS1 that are specified in the daily, thrice weekly and weekly columns of the respective site-specific monitoring schedules.

SECTION 10: MONTHLY MONITORING

Final effluent and select process subcategory effluent streams will be monitored monthly for some or all of the following analytical test groups:

- Group 2 Cyanide;
- Group 4a Ammonia plus Ammonium;
- Group 9 Total metals;
- Group 10 Hydrides;
- Group 11 Chromium (Hexavalent);
- Group 12 Mercury;
- Group 16 Volatiles, Halogenated;
- Group 17 Volatiles, Non-Halogenated;
- Group 19 Extractables, Base Neutral;
- Group 20 Extractables, Acid (Phenolics);
- Group 23 Extractables, Neutral Chlorinated;

An interval of two weeks between successive monthly samples is required in order to provide a representative data base of independent samples over a wide range of operating conditions

Monthly samples must be collected on the same day as the thrice weekly samples for the same effluent stream in order to provide as complete a set of analytical data on a given day as possible.

SECTION 11: MONTHLY MONITORING - COOLING WATER

Cooling water streams will be monitored on the same day and at the same monthly frequency as final effluent streams in order to provide a better indication of plant operations at the same point in time. Cooling water will be monitored for parameters that are representative of plant processes in order to tell whether contamination of cooling water has occurred. Some or all of the following parameters are included in the monitoring of cooling water:

- Ammonia;
- Cyanide;
- Dissolved Organic Carbon;
- Iron;
- Lead;
- Oil and Grease;
- Phenolics (4AAP);
- Suspended Solids;
- Total Phosphorus;
- Zinc;

SECTION 12: MONTHLY MONITORING - STORM WATER

A total of 12 samples is required during discharges of storm water at each affected storm water sampling point. Thaw samples are needed to provide an indication of the losses of contaminants during the winter months.

In cases where samples cannot be collected from a storm water sampling point because of a lack of sufficient volume of discharge, a set of samples must be collected during a subsequent storm event or thaw to provide a total of 12 data points for the regulatory period.

Samples should be collected towards the beginning of the discharge in order to catch the "first flush" effects. However, in cases where a retention structure is available to provide holdup time, a sample representative of the contents of the structure may be collected directly from the structure prior to the storm water discharge.

The list of parameters to be monitored reflects the candidate parameters for control which are being monitored in process and final effluents.

SECTION 13: EVENT ORIENTATED MONITORING

Plants which recycle their process water will have to monitor only if discharges of process water take place. In this event, the discharger will sample for both process subcategory and final effluent streams.

SECTION 14: EVENT ORIENTATED MONITORING - STORAGE SITE EFFLUENT

Raw materials are stockpiled in order to guard against fluctuations in supply. Run-off from coal and coke stockpiles may be caused as a result of water that is applied to the stockpiles to suppress dust or from precipitation. Samples should be collected towards the beginning of the discharge in order to catch the first flush effects.

SECTION 15: EVENT ORIENTATED MONITORING - WASTE DISPOSAL SITE EFFLUENT

Samples are only required monthly if a discharge of waste disposal site effluent occurs. The discharge of effluent will originate primarily as a result of a storm event. Therefore, the samples should be collected towards the beginning of the discharge to catch the "first flush" effects, as noted in the section above.

SECTION 16: EVENT ORIENTATED MONITORING - EMERGENCY OVERFLOW EFFLUENT

Monitoring of emergency overflows is intended to measure an effluent which discharges directly to a surface watercourse bypassing all designated final effluent sampling points at the site.

Monitoring parameters are specified on the basis of the untreated process subcategory effluent which could be present in the overflowing effluent stream.

SECTION 17: QUALITY CONTROL MONITORING

Each of the quality control samples to be collected provides different information about the quality of the effluent samples collected and indicates possible field contamination. Process subcategory effluents, final effluents and cooling waters will require field quality control samples.

Monthly quality control monitoring of one process and one final effluent stream is required for those parameters which are analyzed on a daily, thrice weekly and weekly basis. The quality control samples are collected on the same days as the daily, thrice weekly and weekly samples specified in sections 6, 7 and 8 respectively.

Semi-annual quality control monitoring of one process and one final effluent stream is required for those parameters which are analyzed on a monthly basis. The quality control samples are collected on the same day as the monthly samples specified in section 10.

Semi-annual quality control monitoring of one cooling water stream is required for those parameters which are analyzed on a weekly and monthly basis for that cooling water stream. The quality control samples are collected on the same day as the monthly control samples specified in section 11.

A duplicate sample provides a measure of the reproducibility of sampling techniques used at the site including the integrity of the sample containers.

A travelling blank sample will provide an indication of any problems with sample contamination due to extraneous volatile fractions of contaminants in the atmosphere and any contaminants introduced by handling of the sample containers. Analytical test groups 3 (pH) and 8 (TSS/VSS) are excluded from the analysis.

Travelling blanks for TSS/VSS are relatively ineffective. Gross contamination would be required to be detected at the ppm levels of detection for these tests. No information relevant to samples is to be gained for pH on a travelling blank of distilled water.
A travelling spiked blank sample should provide an indication of the degree of degradation of the target parameters from sampling to analysis, which in turn may indicate degradation of the target parameters in the effluent sample itself. Only analytical test groups 16 through 24 and 27 are to be analyzed as they are most likely to volatilize or degrade in the unpreserved solution.

Travelling spiked blanks are not required for the conventionals and metals. Inorganic parameters in samples are stable. Most of the samples are either preserved or are analyzed within very short time periods.

The travelling spiked blank samples must be prepared with a standard solution which contains all of the parameters in the analytical test groups for which the analyses are required.

Additional quality control samples are to be analyzed and prepared by the laboratory, as outlined in section 4 of the General Regulation. These samples will provide an indication of analytical variability and laboratory contamination due to the analytical procedures.

SECTION 18: TOXICITY TESTING

Section 5 of the General Regulation specifies the test protocols which must be followed for the fish toxicity test and the Daphnia magna acute lethality toxicity test. Toxicity test samples are to be collected at each final effluent sampling point.

The samples must be collected on the same day as the monthly routine monitoring samples for the same final effluent stream in order to aid in the interpretation and possible correlation of the chemical analyses and the resultant biological effects.

Effluent samples used for the fish toxicity and Daphnia magna tests are to be taken from the same sample container or set of containers in order to minimize the likelihood of sample differences.

In the case where three monthly fish toxicity tests result in mortality for no more than 20% of the population at each effluent concentration in the serial dilution, toxicity tests will be performed on 100 percent undiluted test solutions for the following fish toxicity tests. Full series dilution fish toxicity testing would resume for a given stream if any one of the pass/fail tests showed mortality above 20%.

It is not unusual for one fish in a sample to suffer mortality due to natural causes. Therefore, mortality greater than two fish in most cases would be an indication of some effluent lethality.

Daphnia magna acute lethality test will be performed monthly using full series dilutions.

Full series quarterly Daphnia magna and fish toxicity tests are required for cooling water streams to verify their non-lethality. The toxicity samples must be collected on the same day as the routine monthly monitoring samples for that stream in order to provide a correlation of the chemical analyses and the resultant biological effects.

SECTION 19: FLOW MEASUREMENT

Protocols and procedures for flow measurement are outlined in section 6 of the General Regulation.

Flow measurement accuracy requirements are a function of stream type. A flow measurement accuracy of ±7% of the actual flow is required for all process subcategory effluent streams that will be equipped with new flow measurement devices in order to establish accurate loadings on those streams.

A flow measurement accuracy of ±15% is required for existing flow measurement devices that measure process subcategory effluent steams and that cannot meet the ±7% requirement.

All final effluent flows will be continuously measured with an accuracy of ±20% of the actual flow.

In the event that a direct discharger is unable to continuously measure the flow of a final effluent stream and where that final effluent streams receives measured flows from contributing process subcategory effluent streams, the final effluent flow may be estimated with an accuracy of ± 20%. The estimate must be made at the time of sampling on three separate occasions over the twenty-four hour sampling period.

An accuracy of ±20% is required for all other stream types such as cooling water, waste disposal site effluent, storage site effluent and emergency overflow effluent streams in order to provide loading estimates and to determine their potential impact on the environment.

Flow measurement requires the use of primary and secondary flow measurement devices. Typical primary flow measurement devices are:

- parshall flumes;
- weirs;
- orifice plates;
- mag meters;
- venturi meters.

Typical secondary flow measurement devices are electronic interfaces with the primary devices which interpret the measurements and convert them to usable flow data. These data are commonly presented in a continuous chart form or discrete readout. A continuous chart is preferred to provide a record of the flow variability.

In cases where a storm water effluent or waste disposal site effluent is collected in a retention structure prior to discharge, the volume discharged may be measured using the change in the retention structure level.

The General Regulation requires that good maintenance and calibration practices for the measurement devices be followed.

SECTION 20: REPORTING

Section 7 of the General Regulation outlines the reporting requirements for each direct discharger. The contents of an Initial Report to be submitted prior to monitoring under the Regulation are outlined in the General Regulation.

All information which is considered by the plant to be confidential business information must be so identified on each page submitted to the Ministry.

The Initial Report must be submitted to the Regional Director of the Ministry within three months and seven days following promulgation of the Regulation. This report is intended to provide the Ministry with a clear understanding of plant processes and the procedures each plant will follow in carrying out the requirements of this Regulation. Four copies of the Initial Report, including any attachments, should be provided.

A guidance document will be available from the Ministry prior to promulgation of the Iron and Steel Sector Regulation to provide assistance in preparing the Initial Report.

Results from all analyses performed by the laboratory must be reported, including all positive numerical values at or above the laboratory calculated method detection limit. In those cases where a laboratory has a method detection limit lower than the maximum allowed by the Regulation, all positive values below the MISA method detection limit must be reported. This will ensure that accurate data is reported.

Flow measurement information must be reported for all process subcategory effluent, final effluent and cooling water effluent streams. The duration and approximate volume of discharge of storm water, waste disposal site effluent and emergency overflow is to be reported.

The date and duration of each storm event, the amount of rainfall and the approximate duration of each discharge is required. This information is required in order to correlate the analytical data with the event which occurred. A heavy rainfall or a close succession of storm events may lead to dilution not only of the storm water but also of other effluents and may thereby impact on the analytical results.

A schedule of the intended sampling dates and times for monthly and characterization sampling is required for Ministry inspection purposes. Inspection samples will be collected for the Ministry concurrent with the collection of samples by the plant site. Sampling procedures used at the plant will also be inspected during Ministry inspections.

The quantities of chemicals added to cooling water and the patterns of these additions are required in order to provide a greater understanding of the potential contamination. Routine monitoring of cooling water is designed to identify long-term leaks from process subcategory effluent streams.

A flow variability report, as specified in subsection 3(5) of the General Regulation, is required for each process subcategory effluent stream and final effluent stream from which samples were collected other than by means of an automatic flow proportional composite sampling device. This report is intended to be used by the plant to show that the effluent flow is non-variable and therefore would not require flow proportional sampling for further collection of samples.

Failure to provide a flow variability report will designate the effluent stream as a variable flow stream requiring flow proportional sampling within 3 months of the report due date. Flow proportional sampling will thus begin within 3 months of the end of the twelve month monitoring period.

A report detailing any equipment malfunctions or any other problems which interfere with carrying out the requirements of both the General Effluent Monitoring Regulation and Iron and Steel Sector Regulation, and the remedial actions taken, must be provided. The reasons for non-compliance with the requirements, as documented in this report, may be taken into consideration by abatement and enforcement staff investigating an act of non-compliance.

All other records which are required to be kept by this section are primarily for inspection purposes to ensure compliance with this Regulation. The records should be kept for a period of two years beyond the submission of the last report in compliance with the requirements of the Iron and Steel Sector Regulation.

SECTION 21: TIMING

The Initial Report is required within three months and seven days following promulgation of the Regulation.

The sampling, analytical, flow measurement, toxicity testing and reporting requirements come into force five months after promulgation of the Regulation. The five month implementation period is intended to provide sufficient time to allow the plant site to purchase and install equipment, negotiate contracts with laboratories, set up their monitoring programs and train personnel.

The requirements of section 5 to 8 and sections 10 to 18 are revoked one year after coming into force. In order to provide sufficient monitoring during the period before the effluent limits regulation is promulgated, there will be weekly monitoring requirements for final effluent streams. These weekly monitoring requirements will include the parameters in analytical test groups 2, 3, 4a, 5, 6, 7, 8, 9, 14, 25 and IS1 that are specified in the daily, thrice weekly and weekly columns of the respective site-specific monitoring schedules.

The weekly samples must be collected and analyzed according to the principles and protocols followed during the twelve month monitoring period. Flow measurement of these streams must continue with the accuracy specified in the General Regulation.

Reporting of all analytical and flow measurement results is required according to the General Regulation. Characterization and toxicity testing will not continue under this Regulation beyond 12 months.

PART V

MISA ADVISORY COMMITTEE REPORT REGARDING THE DRAFT EFFLUENT MONITORING REGULATION FOR THE IRON AND STEEL SECTOR

Ontario

Ministry of the Environment
Ministère de l'Environnement

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January 11, 1989

The Honourable Jim Bradley
Minister of the Environment
135 St. Clair Avenue West
Toronto, Ontario
M4V 1P5

Dear Mr. Minister:

Attached is the MISA Advisory Committee Report Regarding the Draft Effluent Monitoring Regulations for the Iron and Steel Sector, provided in response to your letter of September 14, 1988.

The report has the unanimous support of MISA Advisory Committee members, including the representative of the Iron and Steel Sector, Mr. Al Schuldt.

The Committee commends the Ministry and Industry for working long and hard to develop this regulation package. The Committee would be pleased to discuss the report with you and your staff at any time.

Respectfully submitted,

Jim MacLaren, Chairman
for the MISA Advisory Committee

ONTARIO MINISTRY OF THE ENVIRONMENT
MUNICIPAL/INDUSTRIAL STRATEGY FOR ABATEMENT

MISA ADVISORY COMMITTEE

REPORT regarding the EFFLUENT MONITORING REGULATIONS FOR THE IRON AND STEEL SECTOR

December 1988

Jim MacLaren
Chairman

Toby Vigod
Vice-Chairman

December, 1988

MISA ADVISORY COMMITTEE REPORT REGARDING THE EFFLUENT MONITORING REGULATIONS FOR THE IRON AND STEEL MANUFACTURING SECTOR

1. INTRODUCTION

The documents comprising the September 12th draft Effluent Monitoring Regulations for the Iron and Steel Manufacturing Sector were referred to the MISA Advisory Committee on September 14, 1988 in advance of Committee meeting 37 held on Friday, September 30th, 1988. At that meeting, Ministry staff, namely Peter Seto, Manager of the MISA Office, and Yousry Hamdy, Senior Sector Specialist, explained the document and answered questions. Mr. Al Schuldt, the Iron and Steel Sector Representative to the Committee was not able to attend on that date, but advised that he had no objection to the Committee proceeding with its review.

A second meeting with Mr. Schuldt and others of the industry in attendance was held on October 14th last (Meeting 38) to discuss the Committee's concerns related to draft regulations. These concerns were focussed by Mr. Kai Millyard, a Committee member who acted as observer to the Joint Technical Committee for this Sector. Committee concerns were concentrated in members' difficulties in determining the rationale for frequency of sampling and for the elimination of certain chemicals identified on the EMPPL.

Final pre-regulation monitoring results were made available and a second version of the draft regulation was developed by a representative group of the JTC for the Iron and Steel Sector assisted by two of the Advisory Committee's representative members, Messrs. Schuldt and Millyard and guided by the Ministry's Senior Sector Specialist. This second draft, dated November 1988 was provided to the Committee on November 2nd and discussed at the Committee's Meeting 39 held on Friday, November 4th.

The revised development document proved to reduce substantially the Committee's concerns but did leave several issues relating to the technical justification of the elimination of certain chemical groups from the monitoring regulations despite their disclosure during the pre-regulation monitoring period. The omission of the measurement of specific conductivity on all mill effluent was a puzzlement to many on the Committee.

The Industry representative serving on the Advisory Committee and the Ministry staff agreed to reconsider the draft document in the light of these reduced concerns and to report back to the Committee by November 7th. This was done and as a result your Advisory Committee met at 11:00 a.m. on Thursday, November 10th to review the amended draft document. The sector representative advised that the industry had agreed to undertake conductivity measurements.

The MISA Advisory Committee continued to express concerns over the clarity of the rules applied to the development of the Monitoring Schedules. A revised draft Development Document tabled with the Committee at its Meeting held on November 25 contained improved statements of rationale which generally satisfied these concerns.

It should be noted that the 7 mills which comprise this manufacturing sector vary greatly in size and process technology. The largest mills are complex Iron and Steel works which use as much as 1.1 million cubic metres of water per day, while some of the specialty steel mills use less than 25,000 cubic metres per day. The significant range in water use and waste production justifies differences in the extent and complexity of effluent monitoring at individual sites.

2. ADVICE TO THE MINISTER

The MISA Advisory Committee has reviewed the final draft package, and generally supports the regulation which has been arrived at after considerable and intensive effort on the part of the many participants.

The MISA Advisory Committee recommends the regulation package be released for public review.

3. REGULATION - SPECIFIC COMMENTS

a) MAC has recommended standardized formats for all MISA monitoring regulations. This document reflects this approach, and should make this and future regulations easier for all interested parties to work with.

b) MAC is also pleased with the characterization requirements found in this regulation, and considers them a precedent for this monitoring regulation series.

4. PROGRAM - SPECIFIC RECOMMENDATIONS

Although previous recommendations on statistical rationale, listing and delisting, data reporting and use as well as event monitoring still stand, it is not the intention of the Advisory Committee to repeat its positions on these matters.

However the Advisory Committee commends the authors of this draft document for its reference to the need for the development of an adequate Quality Assurance/Quality Control Program. This Committee cannot over-emphasize the need for such a program based on round robin testing that will ensure that the data acquired at the cost of many millions of dollars through the effluent monitoring phase of the MISA program are technically comparable and legally defensible. **The MISA Advisory Committee recommends that at the earliest opportunity, the Ministry spell out in detail in a public document, the exact nature, procedures and expected outputs of the MISA QA/QC program.**

MAC recognizes the need for a clear statement of the rules used for the selection of compounds and assigning frequencies for routine monitoring schedules. As has been provided in the Development Document for this sector, **MAC recommends that all sector development documents include a comprehensive tabular statement of rules applied to the development of the monitoring schedules, and that the results of the pre-regulation monitoring data are included in summary tabular form.**

MISA Advisory Committee Report regarding the Draft Effluent Monitoring Regulations for the Iron and Steel Sector.

Submitted, December 1988

MISA ADVISORY COMMITTEE

Jim MacLaren, Chairman

Toby Vigod, Vice-Chairman

Harvey Clare, Member

Isobel Heathcote, Member

Paul Hebert, Member

Don Mackay, Member

Kai Millyard, Member

Al Schuldt, Member, representing the Iron and Steel Sector

PART VI

MINISTRY OF THE ENVIRONMENT RESPONSE TO THE MISA ADVISORY COMMITTEE REPORT

Ontario

Office of the Minister

Ministry of the Environment

135 St. Clair Avenue West
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416/323-4359

January 23, 1989 01M2003

Mr. J. MacLaren
Chairman
MISA Advisory Committee
Suite 502
112 St. Clair Avenue West
Toronto, Ontario
M4V 1N3

Dear Mr. MacLaren:

I would like to thank you and the members of the MISA Advisory Committee (MAC) for your review of the Draft Effluent Monitoring Regulation for the Iron and Steel Sector.

I am attaching the Ministry's response to specific recommendations made by MAC on the Iron and Steel Sector Monitoring Regulation.

I hope that these comments will assist members of the public in reviewing the regulation and providing comments.

Yours sincerely,

Jim Bradley
Minister

Enclosure:

RESPONSES TO THE MISA ADVISORY COMMITTEE (MAC)

RECOMMENDATIONS ON THE DRAFT MONITORING REGULATION

A synopsis of major recommendations from MAC and the corresponding MOE responses is provided. Further details are contained in the MAC's report and in the "Technical Rationale for the Monitoring Requirements" - Part II of the development document to the Regulation.

A. REGULATION-SPECIFIC COMMENTS

MAC's Recommendation

MAC recommends standardized format for all MISA Monitoring Regulations. MAC also considers the characterization requirement adopted in this regulation to be a precedent for all the monitoring regulations.

MOE Response

The Ministry will also use a standardized format for all MISA regulations and development documents, while accommodating the specific needs of any particular sector. The Ministry will continue to maximize the number of characterizations in the monitoring regulations. The final number of characterizations will depend on the nature of the sector's effluent and the existing data base.

B. PROGRAM-SPECIFIC RECOMMENDATIONS

MAC's Recommendation

MAC reiterates its previous recommendations on the need for: a comprehensive statistical rationale for the assignment of monitoring frequencies, a mechanism for listing and delisting of parameters, a policy on data reporting and use, as well as the development and application of techniques for event monitoring.

.../2

MOE Response

The Ministry is setting up working groups to deal with these issues and other issues relevant to the MISA program.

MAC's Recommendation

MAC recommends that at the earliest opportunity the Ministry spell out in detail in a public document the exact nature, procedures and expected outputs of the MISA QA/QC program.

MOE Response

The Ministry has initiated steps to address MAC's concern. A workshop was held recently by the Ministry, with participation from the private laboratories and industries, to present and discuss the AQ/QC program. In addition, staff from Laboratory Services Branch is scheduled to make a presentation to MAC on the 27th of January, 1989, on this issue.

MAC's Recommendation

MAC recommends that all sector development documents include a comprehensive tabular statement of rules applied to the development of the monitoring schedules, and that the results of the pre-regulation monitoring data are included in summary tabular form.

MOE Response

The Ministry will ensure the inclusion of the rules as well as results of pre-regulation monitoring as appropriate in the development documents.